ASSESSING THE CHALLENGES OF PATENT AND RESEARCH EXEMPTIONS ON RESEARCH CAPACITY AND UTILIZATION IN UNIVERSITIES, RESEARCH INSTITUTIONS AND INDUSTRY IN BOTSWANA

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ABSTRACT

The study analyzed the opinion of a stratified sample of 366 people from universities, research institutions, government ministries and industry in Botswana on how patent regime and research exemptions impact on their research capacities and utilization of research outputs. The results of the study showed that although awareness of the use of patent rights to protect their invention was low (67%), the utiliztion of patent was extremely very low (8%). In addition, over 75% of the respondents were convinced of the need of granting universities and research institutions statutory research exemptions. In their view, granting such exemptions will enhance the researchers' abilities to verify the truthfulness and accuracy of patent claims, and be able to compare old and new technologies. The study therefore recommends that (i) the IP Unit in the relevant ministry needs to adopt a more proactive role by sensitising people, especially those whose activities may result in inventions, about their IP rights, how these rights can be protected, the advantages of protecting their rights to inventions through patents and the patent procedure. Information literature contained in leaflets and other types of flyers should be widely used; (ii) The Tertiary Education Board, which is the supervisory body for education in the country needs to formulate an IP policy which should guide all the tertiary institutions in the country; (iii) The existing legal framework on patent rights and research exemptions in Botswana need to be made more effective; (iv) The Government, tertiary institutions and industry must be compelled to allocate funds for research and innovation; (v) Financial incentives, possibly through a 50/50 sharing of royalties from patents should be introduced; and (vi) Academic institutions should device well-publicised schemes to recognise and reward innovative initiatives by staff.

Key words: Patent, Research Exemptions, Intellectual Property, Awareness

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EXECUTIVE SUMMARY

Globalisation and the tremendous advances in information technology in the last decades have made intellectual property rights very important, especially for underdeveloped countries such as Botswana whose legislation in this area only dates from independence in 1966. This study however only focuses on the patent system, which is a key tool in promoting research and innovation.

The literature on the topic shows extensive discussions on the advantages and disadvantages of the use of research exemptions as a tool to bridge the dual purpose of the patent system, namely, providing incentives to innovate and disclosing technology that might otherwise be kept secret. There is however hardly any literature on the situation in Third World countries like Botswana. The main objective of the study was therefore to assess the challenges of patent and research exemptions on research capacity and utilization in universities, research institutions and industry in the country.

A brief overview of the legal framework in Botswana is undertaken. It is shown that the protection of intellectual property rights in the country is regulated by a combination of common law and statutory law and that the country has ratified most of the international conventions dealing with intellectual property rights protection. Whilst it is clear that the existing legal framework provides internationally-recognised standards of protection for both foreign and domestic patent holders, it is less clear how this balances the patentee's rights and the exemptions granted for research.

Empirical evidence was obtained through the use of questionnaires administered to researchers in academic and research institutions, manufacturing industries and companies throughout the country, backed by two focus group discussions (one in the south of the country and the other in the north) and an exhaustive study of the records of patents registered in the country before and after independence. The empirical findings gathered from the questionnaires and focus group discussions were carefully analysed and a number of conclusions were drawn.

First, that in spite of intellectual property legislation having been introduced as early as 1966, the level of patent awareness and possibly intellectual property awareness in the country generally is low. Most researchers, whether in the academia or in industry, claim some awareness about the existence of patents but on closer questioning, it becomes clear that such knowledge is usually very superficial. Hence, the existence of a legal framework dealing with patents and its attempts to provide incentives and promote research and innovations, especially through research exemptions is bound to be ineffective in the absence of patent awareness.

Second, whilst it is clear that the existing legal framework recognises and protects patents, the nature and scope for encouraging research use of patented inventions through research exemption is less clear. A wide variety of options are available for addressing the problems associated with experimenting with patented products. It is necessary that for patent legislation to be balanced, it must also contain an experimental use exemption to enhance the prospects of encouraging research and innovation with respect to patented products.

Finally, it is also necessary that incentives to innovate, such as royalty sharing agreements and special achievement awards are provided to encourage inventors. At the end of the day, the critical issue seems to be the need to create an awareness of the potential benefits of patents and research exemptions in underdeveloped countries if the legal protection provided is going to have any practical effects on researchers.

1. INTRODUCTION

For long, Botswana has recognised the importance of protecting intellectual property rights. Just before independence in 1966, it enacted the United Kingdom Trade Mark Law Act and the Trade Mark Act, both of which have since been repealed.[1] There are now plans to repeal the 1996 Industrial Property Act which regulates, inter alia, the patent system. Meanwhile, very little effort has so far been made to understand how well the present patent system is serving its dual purpose of providing incentives for innovation and encouraging the disclosure of information about recent inventions that might otherwise be kept secret, or even about the reforms that are needed to ensure that the system acts as an efficient engine of progress rather than an impediment to it. It is also not clear what impact research exemptions have on research capacity in universities, research institutions and industries in the country. Given that no empirical study has ever been conducted to interrogate these issues, this study undertook to examine this and other related issues.

In order to place the study in its proper perspective, it is necessary to preface this report with a brief background on Botswana generally and an overview of the patent system.

1.1 Brief Background on the Country

Botswana is a landlocked country in Southern Africa and occupies an area of approximately 582, 000 square kilometres. It is bordered by Angola and Zambia in the north, Zimbabwe in the North East, South Africa in the East andSouth, and Namibia in the West. In addition, it touches Zambia at the confluence of the Zambezi and Chobe rivers in the extreme north.

[1] See Cap. 68:04 and Cap. 68:03 respectively, of 1965.

Map of Botswana showing border countries

With a population of about 1.8 million (UN, 2007)[2] its population density of 3.2 people per square kilometre is quite low. The growth rate of 2.4% is expected to drop significantly in the next few years mainly due to the high mortality impact of the HIV/AIDS pandemic.

At independence in 1966, Botswana was classified amongst the twenty five poorest countries in the world. Since the late 1970s however, it has combined an impressive record of dramatic economic growth, due to the discovery of diamonds in 1967, with political stability to become a middle-income country. It has a market-oriented economy that encourages private enterprise and is ranked as Africa's least corrupt country. It has also had one of the world's highest average growth rates during the past four decades but in the last few years, as the price of minerals have fallen, the economy has been severely affected. Nevertheless, provisional national accounts estimates for 2006/07 indicate that the economy gained momentum, with real gross domestic product (GDP) growing at 6.2 percent.[3]

[2] See "Country profile: Botswana," at http://news.bbb.co.uk/1/hi/world/africa/country_profiles/1068674.stm

[3] http://www.bankofbotswana.bw/files/attachments/preliminaries,%20statutory%20report%20and%20botswana%20economy%20in%202007.pdf

Despite the long period of economic growth, especially in the 1990s, many sections of its population suffer from high unemployment and poverty. Perhaps more serious is the fact that efforts to diversify the economy, which is heavily dependent on diamonds, which account for 75% of exports, over 40% of GDP and over 45% of government revenue, have not met with much success. To boost local business and employment, the government has been trying to encourage more value to be added to diamonds locally and recently launched its own diamond trading company – Diamond Trading Company of Botswana – in a joint venture with diamond giant, De Beers. On the other hand, because of its poor soils and harsh climatic conditions, the country is prone to frequent periods of drought and as a result, the contribution of agriculture to GDP has remained below 2% and the country is largely dependent on imported food from other countries, mainly South Africa.[4]

Botswana has not only been one of the few African countries that has since independence maintained a stable and democratic system but it has also over the years gained good reputation for respect of human rights and the rule of law. Like most African countries, it inherited its legal system from the colonial era, but with the peculiar feature shared by a few countries in the Southern African region, such as South Africa, Lesotho and Swaziland, that it combines elements of two distinct European legal traditions namely, the English Common law and the Roman-Dutch law, both of which form the basis of its legal system. The 1966 Constitution provides for an independent judiciary and a recent study has shown that Botswana has one of the freest and most independent judiciaries in the region, if not on the continent.[5] The legal system in general regulates and protects property rights of both citizens and foreigners, and there has, since independence been considerable efforts made through investor-friendly laws and economic policies to attract foreign investors. In the 2008 budget speech, the Minister of Finance however, noted that further administrative reforms on the part of Government to ease the regulatory burden and delays in the provision of services were necessary to sustain robust economic performance.[6]

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[4] Ibid.

[5] See, Democratic Governance and Rights Unit, UCT, The Judicial Institution in Southern Africa. A Comparative Study of Common Law Jurisdictions, Cape Town, SiberInk (2006), pp.14-33.

[6] http://www.bankofbotswana.bw/files/attachments/preliminaries,%20statutory%20report%20and%20botswana%20economy%20in%202007.pdf

1.2 The Basis and Scope of Intellectual Property Law in Botswana

Intellectual property (IP) law in Botswana is regulated by a combination of common law principles and statutory law. Although applicable IP law in Botswana is mainly statutory, there are many aspects of it, such as several actions for unlawful competition which are governed by the common law. Under the common law, an Aquilian action (*actio legis Aquiliae)* can be instituted for the recovery of compensation for patrimonial loss caused by the unlawful conduct of another through acts such as breach of confidence, passing off and injurious falsehood. In modernising its laws to keep pace with current developments and thus provide a conducive environment to attract and retain foreign investors, Botswana has not only grappled with the challenges of enacting laws which reflect the country's mixed Roman-Dutch/ Common law legal heritage but also incorporate many of the principles enshrined in the numerous international treaties on IP that it has signed and ratified or acceded to.

The main sources of Botswana IP law are however statutory law. Prior to 1996, the protection of industrial property rights (patents, trademarks and industrial designs) in Botswana was essentially by the extension of protection granted in the United Kingdom and South Africa.[7] Owners of rights which were protected in these countries forwarded the certificates of grant and registration to Botswana's IP office and the Registrar would simply enter the details of the protected IPR in the respective registers. In 1996, Botswana enacted its first comprehensive legislation on the matter, the Industrial Property Act, 1996 (as amended by the Industrial Property (Amendment) Act 1997). This Act deals with the protection of patents, trademarks, utility models and industrial designs. To implement this Act, the Industrial Property Regulations of 1997 was enacted. The Department of the Registrar of Companies, Business Names, Patents, Trademarks, Utility Models, and Industrial Designs which operates within the Ministry of Trade and Industry is responsible for implementing both the Act and the regulations. A 1965 Copyright Act, that had clearly become inadequate following Botswana's accession to the Berne

[7] For further discussion of this background, see Department of Research, Science & Technology, *Botswana Patents, Utility Models and Industrial Designs Manual*, Government Printer, Gaborone (2006), pp.7-8.

Convention in 1998 was repealed and replaced by the Copyright and Neighbouring Rights Act 2000 (as amended by the Copyright and Neighbouring Rights (Amendment) Act, 2005). The Act deals with the protection of the rights of performers, broadcasters, producers and publishers. There were considerable delays with its implementation and it eventually became effective only from October 2006. Implementing regulations were introduced with the enactment of the Copyright and Neighbouring Rights Regulations, 2007.

IP rights are essentially territorial in nature; they do not operate beyond the borders or national territory and are therefore potentially limited in the protection that they confer a beneficiary. Protection is usually sought through registration under the laws of the different countries where benefits are sought, which could make it very expensive because of the cost of filing fees and agents' fees. To overcome the difficulties arising from the territorial nature of IP rights, a number of international treaties which try to establish uniform standards have been concluded. The most important ones that Botswana has signed are the Paris Convention on Industrial Property (Paris Convention)[8] and becoming a member of the World Intellectual Property Organisation (WIPO), the Agreement on Trade Related Aspects of Intellectual Property (TRIPS),[9] the African Regional Intellectual Property Organisation (ARIPO),[10] the Harare Protocols on Patents, and the Madrid Protocol Concerning the International Registration of Marks (the Madrid Protocol).[11] These treaties fall into two main categories: those which aim to achieve harmonisation through the provision of minimum standards of protection such as the Paris Convention and the TRIPS, and those which aim to achieve international registration in order to obviate the need for an applicant to file an application in each and every country where protection is sought such as the ARIPO and the Madrid Protocol.

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[8] Botswana acceded to this Convention on 15 January 1998 and its membership became effective on 15 April 1998.

[9] Botswana became a member of the World Trade Organisation on 5 May 1995 and became obliged to implement the requirements of this agreement.

[10] Botswana became a member of this organisation on 6 February 1985.

[11] Botswana acceded to the Madrid Protocol on 5 September 2006 and its membership entered into force on 5 December 2006.See, S.T. Morolong,, " The Protection of Trade Marks under Botswana Law," in C.F. Fombad (ed.), *Essays on the Law of Botswana*, Juta & Co Ltd, Cape Town (2007), pp. 212-213.

Many of these International treaties have influenced the nature and content of the statutory framework provided for IP protection in Botswana today. For example, the Copyright and Neighbouring Rights Act offers internationally accepted standards of protection for the rights of creators of literary, artistic, dramatic, cinematographic works, computer programs, broadcasting organisations and sound recordings. In addition, the legislation gives the Government additional tools to fight against piracy. The Industrial Property Act which governs patent and trademark provides internationally-recognised standards of protection for both foreign and domestic holders of patents, industrial designs, trademarks and fully complies with the TRIPS agreement.

There are very few legal firms and qualified IP professionals (e.g. attorneys, agents, licensing professionals) who are in a position to assist the people throughout the patent life-cycle, including, in particular, the application process, the negotiation of license over patented technology and the settlement of disputes over IP rights. The only IP cases the authors came across in Botswana during the literature search was the case between BOTSWANA FOOTBALL ASSOCIATION and Another v. KGAMANE 1998 BLR 153 (CA): 1998 BLR 153 (CA), indicating very minimal activity in the infringement of IP rights. The Law Department at the University of Botswana teaches two courses in IP as a part of the LLB degree programme.

The next two subsections will provide an overview of the specific issue of patents and research exemptions, which are the principal focus of this study.

1.3 An Overview of Patent Law in Botswana

IP law in Botswana rewards and protects the fruits of intellectual endeavour and covers subjects such as patents, industrial designs, trademarks, models, copyright and neighbouring rights.[12] Patents are protected by the Industrial Property Act, 1996 as amended by the Industrial Property (Amendment) Act 1997.[13] What follows is a brief discussion of certain salient issues on the law that applies in Botswana in order to put the whole study in its proper perspective.

1.3.1 Meaning of patent and their importance

Section 2 of the Industrial Property Act 1996 in a rather obscure manner, defines a patent simply as "a title granted to protect an invention under this Act." It also defines a patentee as "the person to whom a patent has been granted" under the Act.

A patent generally speaking, is a temporary exclusive or monopoly right which the Government grants to an inventor, in exchange for disclosing the details of the invention to the public. This right allows the inventor to exclude others from making, using, or selling the invention in the country during the life of the patent. A patent thus represents a *quid pro quo*, the *quid* being the monopoly conferred on the patentee for a number of years and the *quo* being the knowledge which he presents to the public, and which, after the expiry of the patent, will be available for general utilisation.[14]

There are several different types of patents but the most common are utility patents, which cover processes, machines, articles of manufacture, and composition of matter. There are also design patents, which cover the ornamental features (i.e., appearance) of a product and less common are plant patents, which cover newly developed varieties of plants provided they can be reproduced asexually.

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[12] For a general overview, see Andrew Briscoe and John Kiggundu, *A Guide to Intellectual Property Law in Botswana*, Morula Press, Gaborone (2001).

[13] The 1996 Act repeals the UK Trade Mark Law Act and the Trade Mark Act of 1965 which provided for the automatic protection of trade marks granted in the UK and South Africa in Botswana.

[14] See T.M. Burrell, *Burrell's South African Patent and Design Law*, 3rd ed., Butterworths, Durban (1999) at p.1.

Although a patent allows the patentee to exclude others from making or using the patent, it does not necessarily grant the patentee a monopoly or exclusive right to use or practice the invention. A patent right is subject to any prior rights that others may have to related inventions. For example, the inventor of a novel engine design for use on water-driven cars cannot use it on such a car unless he obtains the permission of the person who holds the patent over the water-driven car.

Due to economic globalisation and the tremendous advances in information technology, IP in general and patents in particular have become a very important area of the law.[15] An efficient patent system serves at least three main purposes. Firstly, it serves to promote the development of new inventions. Inventors who are afraid to disclose their inventions because of the fear that this will be copied by others are protected by the temporary monopoly given them by the Government to exclusively exploit the benefits of their endeavours for 20 years provided they disclose the details of this invention to the public. Secondly, the temporary monopoly gives the inventor an opportunity to recoup the cost incurred in the development of the invention. The prospects of being granted a patent acts as an incentive on potential inventors to invest time and money in research, secure in the knowledge that if they succeed, they will be given the chance to reap the reward of their sacrifice. Finally, because it is a condition for the grant of a patent that the details of the invention are made known to the public, this does not only make people to become aware of the invention and its uses but also provides an opportunity for other potential inventors to think up ways of enhancing the invention or developing alternatives to it. This is particularly important where the inventor either refuses to licence his invention or demands a license fee that is considered too high. To overcome this, others may develop alternative technologies around the patent and the society will benefit by having two or more inventions instead of one.[16]

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[15] See Andrew Briscoe & John Kiggundu, *op. cit.*, at p. 1.

[16] See, "Crash course on Patents: What is a Patent and why is it useful?" http://www.iusmentis.com/patents/crashcourse/whatis/

1.3.2 Requirements for patentability

The requirements for obtaining a patent are spelt out in section 8(1) of the 1996 Act which states that, "an invention shall be patentable if it is new, involves an inventive step and is industrially applicable." In other words, to be patentable, an invention must satisfy three requirements, first that it is new (novelty requirement), second that it involves an inventive step (the non-obviousness requirement) and finally, that it is industrially applicable (the utility requirement).

1.3.2.1 Newness or novelty requirement

According to section 8(3) of the 1996 Act, "an invention is considered to be new if it does not form part of prior art." "Prior art," is defined by the Act as "anything which has been disclosed to the public, whether in Botswana or elsewhere, in tangible form or orally, or by use or in any other way, prior to the filing or priority date of the application claiming the invention."[17]

The novelty requirement is absolute and means that it is essential for the inventor to keep his invention secret before he makes an application for a patent. However, the invention could be disclosed to others in confidence but it is essential that the inventor does so only after a written secrecy agreement has been signed. The novelty of the invention is usually assessed by carrying out searches in existing publications, including previous patent specifications.

The Act however provides a grace period of 12 months during which publications by the inventor are not taken into account in determining the novelty of the invention. In this regard, section 8 (4)(b) states:

"Disclosure of information which would otherwise affect the patentability of an invention claimed in the application shall not affect the patentability of that invention where the information was disclosed during the twelve months preceding the filing date or, where priority is claimed, the priority date of the application –

[17] Section 8(4)(a) of the 1996 Act.

i) by the inventor; or

ii) by a third party which obtained the information directly or indirectly from the inventor."

This means that publication of information concerning an invention is not necessarily fatal to a patent application provided an application for a patent relating to that invention is made within a period of twelve months from the date of the disclosure of the information or the public display of the invention.

1.3.2.2 Inventive step or Non-obviousness requirement

An invention that is novel in the strict sense of the word may be unpatentable if it does not involve an inventive step because it is considered to be obvious to a person skilled in the same art or technology involved. Section 8 (5) states this requirement thus:

"An invention shall be considered as involving an inventive step if, having regard to the prior art relevant to the application claiming the invention as defined in subsection 4(a), it would not have been obvious to a person having ordinary skill in the art."

The combination of the requirement of "inventive step" and "non-obviousness" in the definition of this requirement makes its interpretation slightly stricter than where only one of these requirements is stipulated.[18] However, an invention will still involve an inventive step if it provides a solution to a technical problem which can be found in the state of the art provided this solution is not obvious to a person skilled in that art. It must be such as to invoke the reaction, "why didn't I think of that," from an expert in the art.

1.3.2.3 Industrial application or utility requirement

Section 8 (6) explains this third requirement as follows:

"An invention shall be considered as being industrially applicable if it can be used in trade, or in any kind of industry including handicraft, agriculture, fishery and services."

[18] See, "Crash course on Patents: Requirements for Patentability," *op. cit.*

The main aim of this requirement is to ensure that patents are only granted for inventions that have a practical application industrially. The term "industry" is defined broadly hence an invention will be considered as having industrial application or utility if it can be used in trade as well as in handicraft and agriculture. Another purpose of this requirement is to distinguish aesthetical from scientific inventions, with the protection being limited only to the latter.

1.3.3 Inventions that are excluded from patent protection

The fact that an invention satisfies the three requirements specified in the 1996 Act does not necessarily mean that it must automatically be protected by a patent. Certain types of inventions are expressly excluded from patent protection. In this regard, section 9 states:

"(1) For the purposes of this Act, the following shall, even if they are inventions, not be protected as patents –

(a) a discovery;

(b) a scientific theory or mathematical method;

(c) a literary, dramatic, musical or artistic work or other aesthetic creation;

(d) a scheme, rule or method for doing business, performing a mental act or playing a game;

(e) a program for a computer;

(f) methods for the treatment of the human or animal body by surgery; and

(g) a diagnostic method practised on the human or animal body.

Subsection 2 qualifies this by stating that, "the provisions of subsection (1)(f) and (g) shall not apply to any product for use in the methods referred to therein." Besides this, as a general principle, any invention which is contrary to public order or morality will not be protected.

1.3.4 Those who may apply for a patent

Only the inventor or person to whom he has assigned the right to the invention may apply for a patent.[19] Where two or more people have made the invention jointly, the right to the patent belongs to them jointly.[20] Where however, two or more people made the invention independently of each other, the person whose application bears the earliest filing date or priority date has the right to the patent, unless the application was abandoned, withdrawn or was rejected by the Registrar.[21] Where the invention was made within the scope and in the course of the inventor's employment, then in the absence of an agreement to the contrary, the right to the patent belongs to the employer.[22] Nevertheless, an invention can be jointly owned in specified shares between an employee and his employer where the invention is the result of both the personal contribution of the employee and the resources supplied by the employer. Generally, the right to a patent may be transferred by the inventor by cession, assignment, testamentary disposition or by operation of law.[23]

1.3.5 Application, grant and maintenance of patents

The procedure for the application and grant of patents is regulated by the 1996 Act as well as the Industrial Property Regulations 1997. An application for the grant of a patent must be made on specified forms together with the application fees at the Registrar of Patents, Marks and Designs. The specifications on the form include a description of the invention, one or more claims, drawings or formula where necessary for a clear understanding of the description and an abstract. These specifications are described in detail in section 13(1) as follows:

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[19] Section 10(1), Industrial Property Act 1996.

[20] Section 11(2) *ibid.*

[21] Section 11(3) *ibid.*

[22] Section 11(4) *ibid.*

[23] Section 12 *ibid.*

"(a) a request which shall contain a petition that a patent be granted in respect of the invention in question, the name and such other information as may be prescribed relating to the inventor and agent if any, as well as the title of the invention;

(b) a description of the invention which shall disclose the invention in a manner which is sufficiently clear and complete to permit a person having ordinary skill in the art to carry out the invention, and which shall indicate at least one mode known to the applicant in which the invention can be performed;

(c) a clear and concise claim or claims defining the matter for which protection is sought, which claim or claims shall be fully supported by the description;

(d) such drawings or illustrations as may be necessary for understanding of the invention; and

(e) an abstract in the prescribed form, which abstract shall not be taken into account for purposes of interpreting the scope of the protection, but shall serve merely as technical information."

The most important thing to do is to draft the claims so that the invention is defined broadly enough to provide maximum protection against potential infringement, while at the same time being sufficiently specific to identify the invention and distinguish it from all prior inventions.

After receiving the application, the Registrar must accord it a filing date once he is satisfied that the application contains:

i) an express or implicit indication that the grant of a patent is sought;

ii) information which will enable the Registrar to establish the identity of the applicant, and

iii) information which, on the face of it, appears to be a description of the invention.[24]

After according a filing date, the Registrar examines the application to determine whether it complies with the requirements of section 13 (1) and (2) of the Act. The substantive examining authority for Botswana is the African Regional Industrial Property Organisation (ARIPO). After the examination, ARIPO submits a substantive examination report on which the Registrar bases his decision whether or not to reject the application.[25] Where he grants a patent, the Registrar

[24] Section 21(1) of the 1996 Act. Subsections (2) to (5) deal with the situation where the information received is inadequate and the effect it has on the filing date.

[25] ARIPO provides this service for free although the member countries pay membership fees. This means that Botswana applicants are not required to pay "search and examination fees" for now, although this may change once

must issue a certificate of grant of patent and a copy of the patent to the applicant, record the said patent in the patent register and publish in the Journal, a reference to the grant of the patent. The Journal is the official publication of the Registrar of Patents, Marks and Designs through which the public is informed about applications for the registration of patents, designs and marks as well as about the grant and revocation of these IP rights.[26]

Generally, the route which an inventor decides to use to file an application for the protection of a patent right depends on the scope of coverage desired by the inventor. There are three alternative routes through which one may file an application. These are the national, regional and international routes. Regardless of how the application for patent is filed, the final decision to grant or not to grant a patent enforceable in Botswana is made by the Registrar of Patents, Marks and Designs.

For a national patent application which is useful only where the applicant wants to obtain protection that is valid in Botswana, the Registrar upon receipt of the application checks this to ensure that the minimum formal requirements discussed above have been met. Once the Registrar is satisfied that these have been met, a substantive examination, which as pointed out above, is carried out by ARIPO is done. The results of ARIPO's examination are communicated to the Registrar who makes the final decision.

A regional application is made because Botswana is one of the 16 members of the Harare-based ARIPO. The Harare Protocol empowers ARIPO to grant patents, utility models and register industrial designs which will become enforceable within the territories of member states who are party to the Protocol. An applicant desiring to have his patent, industrial design, or utility model protected in Botswana and in other ARIPO member states that are party to the Protocol may use this route to file for protection as an alternative to filing national applications with the respective countries. The application may be lodged either directly with the ARIPO office or through any of the Protocol's member states. Upon receipt of an application, ARIPO examines it to determine

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Botswana joins the Patent Cooperation Treaty (PCT). This explains why the fee paid for patent protection in Botswana is the lowest in the region.

[26] Section 23 of the 1996 Act.

whether it meets both the formal and substantive requirements and if it is satisfied that it does, then each of the member states (referred to as designated states [DS]) will be informed. Any DS that decides not to recognise the patent within its territory must notify ARIPO, otherwise the patent granted by ARIPO will have the same effect in each DS as an application that was filed in its national office.

Finally, an international application is based on the fact that Botswana is a member of WIPO. Amongst the many treaties and protocols that are administered by WIPO is the Patent Corporation Treaty (PCT) which deals with the filing of international applications for the protection of inventions, particularly patents and utility models. Since Botswana became a member of the PCT in 2003, this treaty allows inventors to file a single international patent application either directly with the PCT receiving office of the International Bureau of WIPO (IB) or through a national or regional office of the member states to which the applicant is either a resident or a national, provided that the national office can act as a receiving office for international applications. The applicant files one application and thereby designates all the 133 member states of the PCT and four regional intergovernmental organisations bound by the treaty.[27] The amendment of the Harare Protocol in 1994 allows ARIPO as a regional organisation, to be designated in any PCT patent application. The implication of this is that the designation of ARIPO is rolled down to all ARIPO states who are contracting parties to the Harare Protocol. All international patent applications go through two stages. It will suffice for our purposes here, just to point out that the first is the international phase which usually lasts 30 months and involves three compulsory stages and one optional stage that an application has to go through. Once all the stages (both compulsory and optional) of the first stage have been completed, the application moves to the second stage, which is the national phase. At this stage, each national office is given the opportunity to examine the application to see if it conforms to both its formal and substantive national requirements. At this stage, the application is the same as that filed for protection in that particular country and the decision of each national or regional office applies only to that territory. In spite of this, the international application still has many

[27] The four regional intergovernmental organisations are; African Regional Intellectual Property Organisation, Eurasian Patent Organization, European Patent Office and Organisation Africaine de la Propriété Intellectuelle.

advantages such as the fact that one application filed secures an international filing date in all 133 states parties to the PCT as well as the fact that there are several cost reduction benefits in submitting just one application.

Be that as it may be, the duration of a patent is 20 years. For a patent or patent application to be maintained in the Register of Patents, the applicant must pay to the Registrar of Patents every year, a prescribed maintenance or renewal fee. Failure to pay in time or at all, might mean that the application has been abandoned or that the patent has been allowed to lapse, in which case it will be in the public domain.[28]

The rights conferred by the patent are elaborately defined in section 24 of the 1996 Act. In general, once the inventor has been granted a patent, he has the exclusive right to use, manufacture and sell the invention without hindrance from competitors or anybody in Botswana. For any other person to exploit the invention, he must obtain a licence from the patentee.[29] This means that for the duration of the patent, the patentee is given a monopoly to exploit the invention himself or to allow a licensee to exploit it, in return for the full disclosure of information about the use of the invention to the public. However, once the patent lapses, either through expiry or failure of the patentee to pay the maintenance fee, the technology becomes public property and the public is free to use it for their own benefit.

Section 25 of the Act confers on the patentee, in addition to any other common law rights, remedies and actions available to him, the right, subject to sections 26, 30 and 31,[30] to institute court proceedings against any person who infringes the patent by exploiting it, without his agreement or authorisation. Because of the potentially high damages that can be awarded for the infringement of a patent, the legislature has introduced a number of exceptions. The most common and obvious exceptions are those provided for in sections 26, 30 and 31. There are other

[28] See section 26 of the 1996 Act.

[29] See section 24 *ibid.*

[30] The three exceptions deal with innocent use (section 26), exploitation by Government or person thereby authorised (section 30) and compulsory licences (section 31).

important ones, such as that found in section 24(3)(a)(iii) of the Act, which is what constitutes the next major aspect of this study that will now be discussed.

1.4 Research exemptions to patent use

Patents grant the right to prevent third parties from acts of making, using, offering for sale, selling, and importing for those purposes a patented product as well as to prevent the use of a patented process[31] without having the patent owner's consent.

The main reason for this exclusive rights conferred under a patent is to ensure that the enrichment of someone else, through the use of the patent owner's property, is forestalled. Thus only the patent owner should enjoy the commercial benefits of the invention. The patent owner, therefore, has exclusive rights to the invention but such rights are not absolute but are subject to exceptions, whose scope will depend on the social and economic objectives of the patent system under which those rights are recognized. Article 8.1 of the TRIPS agreement empowers member states in formulating or amending IP laws and regulations to adopt measures necessary to protect public health and nutrition, and to promote the public interest in sectors of vital imprtance to their socio-economic and technological development, provided that such measures are consistent with the provisions of this Agreement. Thus under this article, the onus will be on the state to consider that purpose of the patent and balance such protection against other values of the society, including the interests of education and research. The information generated under the patent process being both output and input into knowledge should be availalble for further experimentation and research in the interest of scientific and technological progress.

Article 30 of the Agreement on exceptions to rights conferred to a patent, urges member states to "provide limited exceptions to the exclusive rights conferred by a patent, provided that such exceptions do not unreasonably conflict with a normal exploitation of the patent and do not unreasonably prejudice the legitimate interests of the patent owner, taking into account of the

[31] See articles 28.1 and 28.2 of the TRIPS Agreement.

legitimate interests of the third parties". One of such "limited exceptions" is for third parties' use of the protected inventions for experimentation and research eventhough not all expeimentation entails research. This type of exceptions have been incorporated into many national laws regarding patents and other types of IPRs. For example, under section 24(3) (a)(iii) of the 1996 Industrial property Act of BotswanaAct, these exceptions are provided for in these terms:

"3(a) The rights under the patent shall not extend to –

…

(iii) acts done only for experimental purposes relating to a patented invention…"

For the fact that experimentation or research are not enumerated exclusive rights of the patent owner, exercises involving them and for which it may be necesssary to make or use patented product or process calls for exceptions regarding experimentation or research on patented invention. Such exceptions promote not only innovations but also encourage inventions and invalidation of wrongly granted patents.

As Kalyan Chakravarthy and Nandan Pendsey point out, while exclusivity in patent rights encourages invention and innovation by providing economic incentives, exemptions for research or experimental purposes encourage innovative improvement, testing and use of patented inventions.[32] A carefully crafted exemption for research on the functioning of a patented invention will advance the fundamental goal of the patent system to promote innovation through a combination of disclosure and proprietary protection. This will require a careful balance to be struck between the patentee's rights and the exemptions granted for research. Various countries have grappled with the challenge of drawing the line that defines the proper balance.[33] In all TRIPS negotiations, the need to mitigate the exclusive rights of the patent owner has been widely acknowledged. The EC[34], Brazil[35] and Canada[36] proposed the incorporation of a non-exhaustive list of specific exceptions to patent exclusive rights, separately from any provisions on

[32] In, "Research Exemptions in Patent Law," 9 *Journal of Intellectual Property Rights* (2004), pp. 332-341.

[33] Ibid.

[34] See MTN.GNG/NGII/WG/26, 7 July 1988(SectionD.a.(i))

[35] See MTN.GNG/NGII/WG/57, 11 December 1989

[36] See MTN.GNG/NGII/WG/47, 25 october 1989

compulsory licenses. The USA, however suggested that Contracting parties limit the patent owners's rights 'solely through compulsory licenses'. The negotiation on this issue centred around the scope of the exceptions to be allowed, as well as the way in which they would be formulated (Correa, 2004). The draft of July 23, 1990 (W/76) (see, Correa, 2004)), reflected the non-exclusive list approach. It included a specific exception for "experimental purposes":

1. [Provided that the legitimate interests of the proprietor of the patent and of the third parties are taken into account,] limited exceptions to exclusive rights conferred by a patent may be made for certain acts, such as:

   rights based on prior use.
   acts done privately and for non-commercial purposes.
   acts done for experimental purposes.

Preparation in pharmacy in individual cases of a medicine in accordance with a prescription, or acts carried out with a medicine so prepared.

1.5A acts done in reliance upon them not being prohibited by a valid claim present in a patent as initially granted, but subsequently becoming prohibited by a valid claim of that patent hanged in accordance with procedures for effecting changes to patents after grant.

1.6B acts done by government for purposes merely of its own use.

The major problem in the implementation of Article 30 of TRIPS based on the the three-step test without a list of exempted acts is the interpretation. Thus limited exceptions should be granted , but "it should not unreasonably conflict with normal exploitation of the patent and do not unreasonably prejudice the legitimate interests of the patent owner, taking into account the legitimate interests of third parties". However, the meaning of this article was clarified in the EC-Canada case, where a WTO pannel addressed the TRIPS-consistency of Section55(2)(1) and (2) of the Canadian Patent Act regarding 'early working' (also called "Bolar") exceptions. Thus by this exceptions, patented inventions can be used for testing required for approval of pharmaceutical or other products, without the consent of the patent holder (Correa, 2004; Haugen,n.d)). The pannel also sees the three conditions as being "cumulative", and independent each other. In addition, each of the three conditions must be met. However, in terms of interprtation, each must be seen in relation to the other. In the context of Article 30, an exception can be "limited" and yet fail to satisfy the other two (Correa, 2004). The pannel concluded that, in the absence of other indications, the term limited exceptions should be interpreted in relation to the extent to which legal rights have been curtailed, rather than the size or extent of the economic impact (Haugen, n.d). The second condition requires a determination of whether there has been any normal exploitation of the patent and if so, how unreasonable?

Cornea (2004) referred to approaches of the interpretation of the word 'normal' in this condition of limited exception based on article 9(2) of the Berne Convention, namely: an *empirical* meaning of 'normal' as a reference to the usual or regular course of events; and a *normative* connotation in the sense of what normal is according to certain standard (Senftleben, 2004, p.168). The EC-Canada panel held that

> the term can be understood to refer either to an emprical conclusion about what is common within a relevant community, or to a normative standard of entitlement. In terms of Article 30 of the TRIPS agreement, the word "normal" was being used in the sense that combined the two meanings (para 7.54) (Correa, 2004).

Both Canada and European Communities agreed on the interpretation of "exploitation" of the patent as involving the extraction of commercial value from the patent by either selling the product in the market from which competitors are excluded, or by licensing others to do so, or by selling the patent rights outright. The term "normal" though literally interpreted to mean "regular, usual, typical, ordinary, conventional"[37] was understood to mean what is common within the relevant community, or to a normative standard of entitlement. In the context of Article 30, the WTO pannel interpreted 'normal' to have both the empirical and normative meanings (para. 7.54).

The third condition of the TRIPS Agreement requires that the exception should " Not unnecessarily prejudice the legitimate interests of the patent owner, taking account the legitimate interests of the third parties". The legitimate interests of these two parties have to be considered in using the invention. Two issues have to be properly understood: " what are legitimate interests?" and " when can these interests be unreasonablly prejudiced?" While the EC in the EC-Canada case argued that it should be interpreted as legal interests, the WTO pannel were of the view that "legitimate interests " should be interpreted as a normative claim calling for protection of interests that are 'justifiable' in the sense that they are supported by relevant public policies or other social norms (Correa, 2004).

[37] According to the study group which tabled the proposals for revising the substantive provisions of the Berne Convention at the 1967 Stockholm conference, "all forms of exploiting a work, which have, or are likely to acquire, considerable economic or practical importance, must be reserved to the authors" (quoted by Stenftleben, 2004, p.177).

The legitimate interest of the patent owner could be losing economic benefits whereas for the third parties it can be those of follow-on innovators, competitors, and users, as well as the interests of society at large, such as public health crisis or advancing science and technology (op cit).

The United States experimental use exception to patent rights can be divided into the statutory experimental use exception and the common law experimental use exception. Under the statutory experimental use exception, the recent case *Integra v Merck* (2003), the Federal Circuit Court seems to have limited the scope of the statutory exception to experiments carried out for the purposes of facilitating expedited marketing approvals for generic drugs only. The Court, furthermore, held that extending such an exception to new drug development would be contrary to the purpose and language of Hatch-Waxman Act. On the Common law experimental use exception, in the *Madey v Duke* University (2002), the Federal Circuit refused to apply the experimental use exception to exempt university research activities from infringing a patent, as it held that these research activities "unmistakably further the institution's legitimate business objectives, including educating and enlightening students and faculty participating in these projects". It also disregarded the non-profit status of the Duke University (see also IPR Helpdesk, 2006).

Patent laws in most European countries also include a "research exception" (or "research exemption") which permits use of a patented invention for experimental purposes without infringing the rights of the holder. Additionally, there are further exceptions such as those in respect of private and non-commercial use. Switzerland does not have a statutory research exemption, nor are there any court decisions on the issue. In response to the concerns about research hold-up, as a precautionary measure, and in order to serve the interests of researchers in Switzerland, a new statutory research exemption has been included in the Swiss draft version of the new patent law (Swiss patent law revision, information, available at *http://www.ige.ch/E/jurinfo/j100.shtm#a03*(«)). The ongoing patent law reform in Switzerland considers a statutory research exemption under Article 9 1 b of the draft revision of the new law. The regulation provides for the research on the object of the invention to be exempted, even if it is commercially oriented.

Under the German Patent Act of 1968, in force until the end of 1980, there was no specific provision excepting experimental use. The German Federal Supreme Court (BGH) in "Ethofumessat", decision of February, 1989 stated that experiments or trials with a protected pharmaceutical, would only be permitted insofar as such experiments were directed to the substance itself, for example to determine the substance's inherent property (German Federal Supreme Court (BGH) of February 21, 1989).

In the United Kingdom those acts which do not constitute an infringement are set out in Section 60(5) of the Patents Act 1977. The origin of these exceptions in the UK lies in the Community Patent Convention (CPC) of 1975. Furthermore, European Community member states agreed in 1989 to eliminate "as far as possible" the differences between national patent law and the provisions of the CPC (Joint Declaration Agreement relating to Community Patents: Official Journal L401, 30/12/1989). Any clarification or amendment of the research exception in this country would need to consider whether this would be necessary Europe-wide

The scope of the exception has been considered in a number of infringement actions. For example, in *Monsanto v Stauffer*4, the Court defined the meaning of "experimental purposes" (Section 60(5)(b) of the Patents Act 1977) and concluded that this did not include trials conducted in order to demonstrate to a third party that a product works as claimed. In 2005, the UK implemented an EU Directive5 which exempts from infringement certain activities performed for the regulatory approval of generic drugs (Section 60(5)(i) of the Act).

1.4.1 The three-step test: Its application to research exception

Research exceptions that allow researchers to make or use patented materials in laboratories and for the purpose of generating knowledge will normally be of shorter duration than the life span of a patent. It will normally not violate the first test. A lot of researches in institutions are directed towards knowledge acquisition, do not have commercial intent and are therefore not of any direct competition with patent owners. Such researches do meet the limited character of the research exception.

Research exception also meets the conditions of the second criteria of Article 30 of the TRIPS agreement. Even when the researches in the institutions are conducted on the patented invention, and beecause the researches are not commercial oriented, they do not unreasonably conflict with the normal exploitation of the patent owner. The patent owner's rights to exclude others from certain commercial benefits of the products or process are not jeopardized (Correa, 2004).

The patent owner's legitimate interest is purely commercial. It does not include the power to control researches and as such there is no need to strike a balance between the patent owner's interests and that of the third parties. Research exception in this case is validated. Young scientists and innovators do not need to be prevented from using the pool of available knowledge generated by their predecessors' work to develop creative and inventive capacities. In a globalized world, considering the legitimate interests of the third parties would imply that there should be no geographical barriers in the utilization of available knowledge.

1.5 Linking patents and research exemptions with universities, research institutions and industry in Botswana

In developed countries, concern over the effects patents are having on scientific innovation both in business and academic research circles have escalated in recent years because of factors such as increased pressure on public research organizations to patent inventions arising from their research, increased use of the patent system, and the increased propensity of patent owners to enforce their rights.[38] In the US, this originally occurred as a result of the Boyd-Dole Act 1980 which for the first time formally allowed universities and other institutions receiving federal research and development funding to patent inventions in order to promote technology transfer. Since then, there has been a tremendous growth in public-private research partnership. Firms, universities, and other publicly supported research institutions have aggressively pursued the

[38] See, Dent C. et al, "Research Use of Patented knowledge: A Review," (2006) *OECD Science, Technology and Industry Working Papers*, 2006/2, OECD Publishing, doi:10.1787/6837/5055704, pp. 8-10.

issue of patenting and the acquisition of licensing to be able to acquire authority to be part of other inventions.

In Europe, academic patenting is seen as an important part of the larger phenomenon of university‐industry technology transfer. In particular, patents are a key tool for protecting innovation in a number of science‐based technologies, such as chemicals, pharmaceuticals, biotech, and many fields of electronics. Academic scientists contribute to these technologies both indirectly, by widening the science base, and directly, by producing inventions susceptible of industrial application, and therefore protected by patents. In recent years, many European countries and the EU have introduced many legislative changes and policy initiatives aimed at pushing universities to take more patents out of their research, due to perceived problems in Europe and perceived advantages in US with respect to technology transfer via patenting.

The African continent has also witnessed significant development in the area of IP. On 9 December 1976 some African countries, in Lusaka, Zambia, created ARIPO for the effective and continuous exchange of information and the harmonization and co-ordination of their laws, policies and activities in intellectual property matters, and the study and promotion of and co-operation in IP matters in collaboration with the Economic Commission for Africa, WIPO and other appropriate organisations. The membership of this body has grown to over 16 states (ARIPO, 2004). As we saw earlier, Botswana has become a member of many of these IP treaties and organisations, such as ARIPO and WIPO. As a result, it is obliged to implement the requirements of these treaties.

There are many research institutions, universities and industries in Botswana which over the years have been actively engaged in research. There has so far been no study undertaken to see whether any of the research has produced output that has or could have been patented. Nor is it clear to what extent, if any, the existing system of patents and research exemptions is impacting negatively or positively in the building of research capacity and innovations in the country. What is now clear is that with the looming recession, and the need to develop and promote local expertise and industry, the patent and research exemption system in place can play a crucial role.

Botswana does provide a potentially fertile ground for critically assessing how the patent system can help in development. For example, it is widely acknowledged that Botswana has emerged as a model of access to medicines and treatment services in Southern Africa because of its excellent response to HIV/AIDS. The utilisation of antiretroviral therapy (ARV) for the treatment of HIV/AIDS has been commended. The innovative public/private partnership between the Government of Botswana and the African Comprehensive HIV/AIDS Partnership in which the Government, the Bill & Melinda Gates Foundation, and the Merk Company support the prevention programmes, healthcare access and treatment of HIV/AIDS provides some vistas for research and the possible development of better drugs to deal with the virus. The limited exception and the legitimate interests of the third parties' aspects of Article 30 of the TRIPS agreement are being invoked by Botswana through application of the "Bolar exception" to acquire generic products of the ARV treatment for its people.

Generally, the fact that patentees enjoy monopoly over their inventions under the patent laws will make it difficult for researchers in the developing countries to assist their governments through technological innovations and the transfer of knowledge. It is also very well known that most inventions and researches that are utilised in the developing countries are conducted and developed in the developed countries, partly because of the minimal support provided by the governments in developing countries to science development and the lack of strong research base in our institutions. Therefore, the existence of patents coupled with the non-involvement of governments and sometimes lack of support of the private sector to the development of science means that developing countries' researchers will make little contribution to scientific innovations. One of the suggestions that have been put up to salvage the direct impact of patent is the research exemption, particularly in the universities and research institutions. Article 30 of the TRIPS Agreement provides the general rule for exceptions which include research exception. This rule, which is commonly referred to as the three-step-test is that, firstly, member states of WTO will provide limited exceptions to patent rights; secondly, the exceptions will not unreasonably conflict with a normal exploitation of the patents; and thirdly, they do not unreasonably prejudice the legitimate interests of the patent owner, taking into account the legitimate interests of third parties. Despite the contestation of these provisions in countries such as the United States, the principle behind the research exemption is that it provides a platform to

allow states to exempt their researchers from being prosecuted when they further explore inventions that have been patented, particularly for the purpose of generating further improvements on those inventions.

The advantages and disadvantages of the use of research exemption as a tool to bridge the dual purpose of the patent system, namely, providing incentives to innovate and disclosing technology that might otherwise be kept secret, have been discussed extensively in the literature (see Cohen, 2005; Geuna and Nesta, 2004; Australian Government,2005; IPR Helpdesk, 2006). There is little in the existing literature on the situation in Third World countries such as Botswana.

1.6 The Objectives of the Study

It is widely acknowledged that much production activities rely on scientific and technical knowledge and that increasingly, firms are drawing on the scientific and technical expertise of universities and research institutions. Universities utilize scientific publication as the means of delivering scientific and technological knowledge to the public. Universities, being public institutions and financed by government, are expected to grant access to scientific and technological knowledge. The university outputs can be externalised to benefit society as a whole. But most firms and industries do not necessarily have the capacity for research and cannot exploit the knowledge produced by universities (Cohen and Levinthal, 1989). They therefore, fail to actually benefit from this public research. Firms have therefore, to develop the upstream research activities, to be able to benefit from the available information and knowledge produced by universities, and universities and research institutions are gradually being pushed through patenting and licensing of their inventions to increase their technology transfer (TT) activities.

Although the law in Botswana presently promotes patenting of inventions and provides for research exemption to the use of patented inventions, the actual or potential impact of this on research development and utilization has never been empirically examined. This study aims to fill this void. It will *inter alia*, provide information on the direction of research in the country's

universities and research institutions; examine the impact of patenting of research inventions by firms and industries on the universities' and research institutions' obligation to provide free knowledge to the public and government for the development of its people and infrastructure through academic research; and also assess what scholars of technological change in Botswana understand about patent, its challenges and merits, and their views on appropriate measures to be adopted so that research exemptions can ameliorate the impact of patenting on research innovations.

The study is exploratory in nature and has the following specific aims and objectives:

(1) Determine the extent of patenting in the universities and research institutions in Botswana, and their interrelationship with industry and firms in Botswana;

(2) Assess how patenting and research exemptions have impacted on the quality and quantity of research output and utilisation in the universities and research institutions;

(3) Examine the extent of usage of research exemption in Botswana; level of support given to research and research development in Botswana by both the public and private sectors; and the challenges researchers are facing as a result of the patent laws;

(4) Review the decided cases on the violations of patent rights in Botswana since independence in 1966 and the interpretations of the clauses in the Industrial Property Act 1996 by the courts; and

(5) Make recommendations to the Government of Botswana, researchers and other stake holders based on the findings.

1.7 Limitations of the study

The results of this study are based on the opinions of a sample of 366 researchers or those affiliated to research institutions or industry in Botswana. The study was exploratory and the nature of the questions demanded that the respondents express their opinions in terms of their personal knowledge, real experience or people who are interested in the subject matter. The questions were not directed to those who had patented their products only.

2. METHODOLOGY

2.1 Scope of the Study

The study covered all the higher educational institutions, the research institutions, companies and industries in Botswana. It involved a visit to the Department of Registrar of Companies where the records of all registered patents in Botswana, before and after independence in 1966 are kept. In addition, two Focus Group Discussions were conducted to gain more in-depth information on the responses to the quantitative research component of the study.

2.2 Study Population

The study targeted all the researchers in the academic and research institutions, manufacturing industries and companies in Botswana.

2.3 Sample Size and Sampling Procedure

Raosoft (2004) has shown that the sample size required to ensure with 99% confidence (allowing an error of plus or minus 5%) that the response of the sampled population is the same as that of the entire population for a population of 1560 is 520 (see also, NCS Pearson, 2004). The list of individuals sampled was, however, 10% more than the required number (that is 572 altogether). These additional individuals were substituted for those on the primary list who could not be located or declined to participate in the study. The proportionate stratified random sampling method was employed in this study. The population was divided into different strata representing the various institutions, industries and companies. This method ensured better representation of all sub-groups of the population in the sample and more statistical precision than the simple random sampling.

The purposive sampling method (a non-probability sampling method), whereby only those possessing the particular and desired characteristics are selected, was employed in identifying

members of the sample from the science-and engineering-based units of the population. This ensured that those to be captured would have been involved in some form of research that might lead to some type of inventions. The snow ball technique, whereby a researcher interviewed is also asked about his/her knowledge of any other researcher who has made some in-route into technology was also employed in the study.

2.4 Instrument for the Study

The study which was exploratory in nature made use of three research approaches, namely: documentary analysis/evidence, questionnaire and focus group discussion (FGD).

2.4.1 Documentary evidence

The documentary analysis, a qualitative approach, reviewed existing literature on patent and research exemption as applicable to Botswana and internationally. Furthermore, it reviewed the records of reported cases to identify any dealing with the infringements of patents rights within the country since independence in 1966. The current law as contained in the Industrial Property Act 1996 and related documents were analysed in the light of provisions made to protect researchers from the infringement on IP.

2.4.2 Questionnaire

The questionnaire (see Annex 1) had 5 parts; Part 1 of the questionnaire solicited general information on the researchers including the type of organizations they were working for. Part 2 contained 16 questions on patent awareness, patent applications, and types of inventions, how patent has affected research motivation and problems with patent application and processing. Part 3 contained 8 questions on IP rights management. Part 4 contained 17 questions on research exemptions: its awareness, procedure and reasons for applying for research exemptions, effect of research exemptions on research capacity and utilizations. Part 5 contained open-ended questions

which solicited from the researchers their opinions on best practices to prevent a drop in research motivation and the circumstances under which the negative impact of patent monopoly can be mitigated by research exemption.

The questionnaires were administered on the respondents by trained research assistants who ensured that all the relevant ethical considerations were taken into account. They ensured that all potential participants in the study were contacted at their work place. The nature of the study was explained and each individual had an opportunity to decline or participate in the study. For those who volunteered to participate, the research assistant administered a questionnaire in English. Confidentiality was maintained by assigning a code number to each questionnaire. The participants were informed that there was no payment for participation. At the end of the data collection, a total of 366 questionnaires were returned giving a response rate of 70.4 percent.

As regards the validation of the questionnaires, this was done by testing them on a representative population, as those being studied and drawn from the University of Botswana, for content, ambiguity, clarity, data quality and time needed for the survey before being used for the main study.

2.4.3 Focus Group Discussion

Two focus group discussions (FGD) were organized, one at Maun in the northern part of Botswana and the other at the University of Botswana in the South Eastern part of the country. The FGD provided an in-depth understanding of answers to some of the questions in the questionnaire and a better understanding of why people were not making use of the available facilities to register their inventions and how the negative effects of patent monopolies on research can be reduced by research exemption. A detailed report of the findings during the two focus discussions are provided later in this report.

2.4.4 Data capture and analysis

Data were captured and analysed using the SPSS programme while the qualitative data were captured through recorders, tapes and later reviewed. The data analyses used descriptive and inferential statistics.

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3. FINDINGS

This section discusses the results of analysis of the collected data and includes , *inter alia*, the characteristics of the sampled respondents' awareness of patents, research exemptions, and obstacles to the use of patent to secure inventions.

3.1 General Characteristics of the Studied Sample

Of the 366 respondents in the study, the majority (48 percent) were from academic institutions, 15 percent were from government establishments and companies and about 7 percent were from research institutes. Only 3.3 percent were from industry while 2.5 percent were either self employed or from consulting firms (Figure 1).

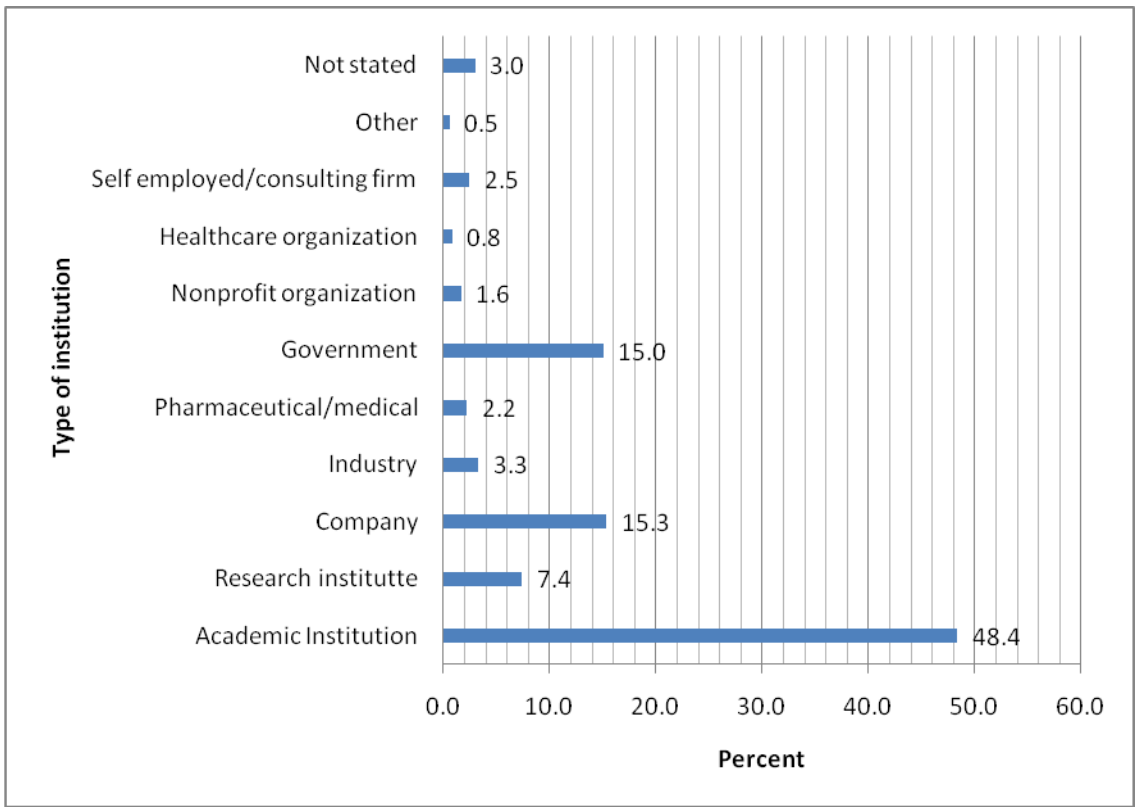


Figure 1: Percentage distributions of the respondent according to the type of institution.

About two in every three respondents (66 percent) have been involved in one form of research or another, while about one-quarter of the respondents (24 percent) have not taken part as key investigators in any research but work in research institutions and are affiliated to researchers. A majority of the respondents (70 percent) were involved in surveys, while 45 percent were involved in desk study and also consultancy. A little over two in every five respondents (43 percent) were involved in experimental researches (N=229).

3.2 Patent Awareness, Method of Acquisition and Problems

About 67 percent of the studied sample was aware of the use of patent system to protect invention. Of this percentage, about 45 percent were from academic institutions, 16 percent from

government establishments, 15 percent from the companies and about 5 percent from industry (Figure 2).

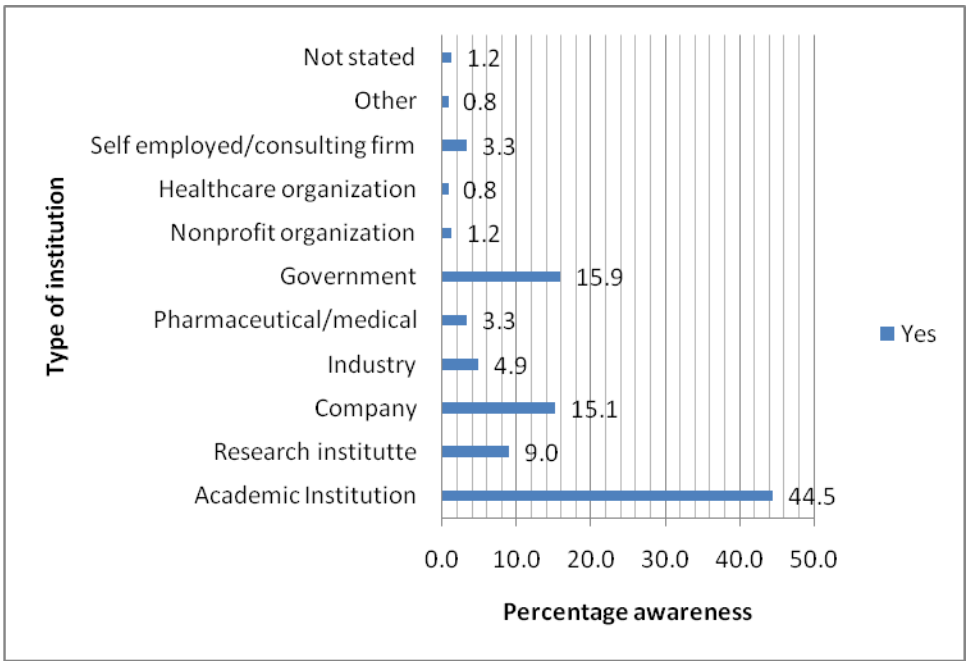


Figure 2: Percentage distribution of awareness of use of patent to protect invention among the institutions.

Despite the fact that two in every three respondents were aware of the use of patent rights to protect inventions, only 29 of them (8 percent) had actually applied for patents in the areas of Manufacturing, Food Science, Design, Electical Engineering/Solar and Publication. Figure 3 shows the respondents' opinions on the various methods that can be used in protecting inventions. The figure reveals that of the respondents who had patented their inventions, 63 percent used sponsored research agreement and 69 percent used exclusive license to protect their inventions, while 44 percent used confidentiality agreement and 31 percent used the material transfer agreement. Use of non-exclusive license was the most unpopular method.

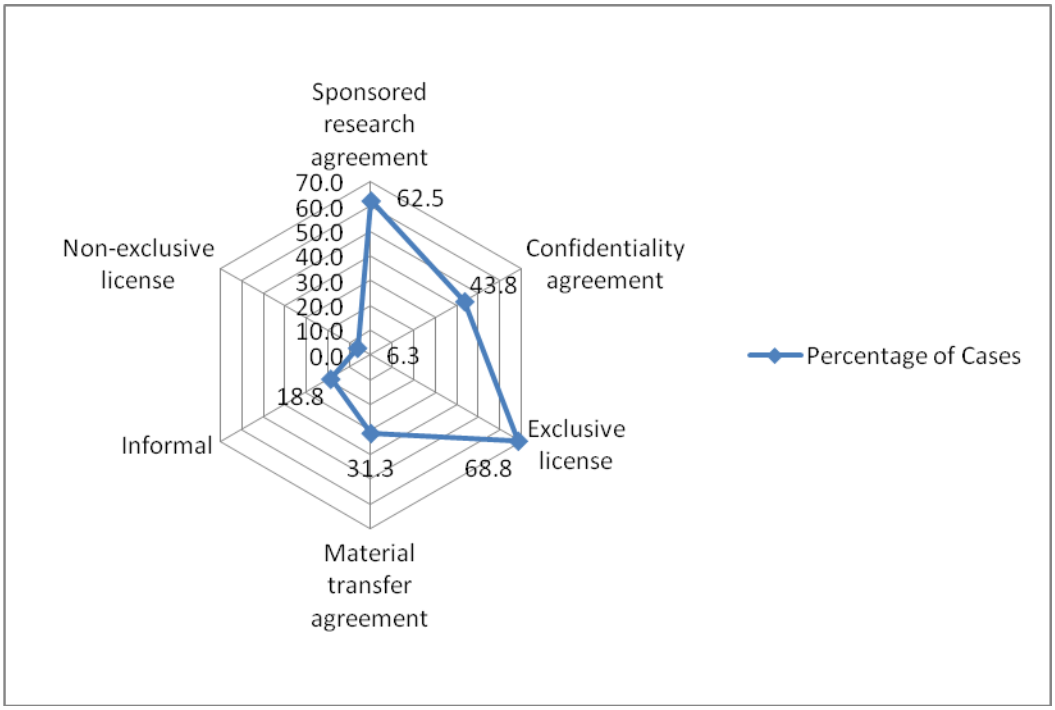


Figure 3: Methods used to acquire patent by the respondents

3.3 Motivating Factors to Acquisition of Patent (Number of cases = 49)

When the respondents were asked what motivated them or their organisation to obtain patent rights for their invention, a majority of them (86 percent) said that they were motivated by the desire to protect their own technology from imitation followed by prevention of competitor's patenting and application activities (76 percent). The other motivating factors were: improving the technological portfolio of the company or institution (63 percent), improving research and development cooperation (61 percent), and improving organizational negotiations such as exclusive licensing and joint ventures (59 percent). The least motivating factor was the incentive to invest in inventive activities (29 percent) (Figure 4).

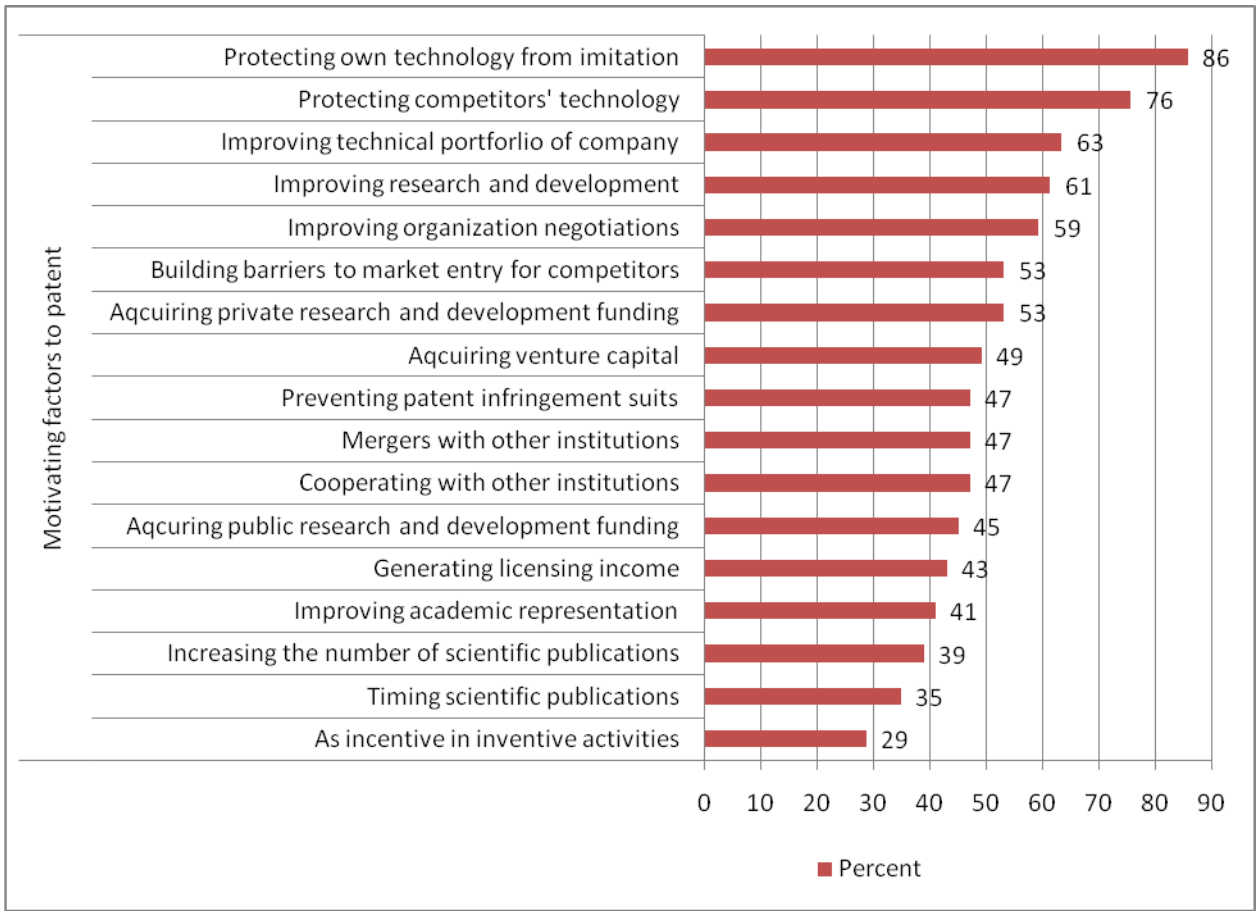
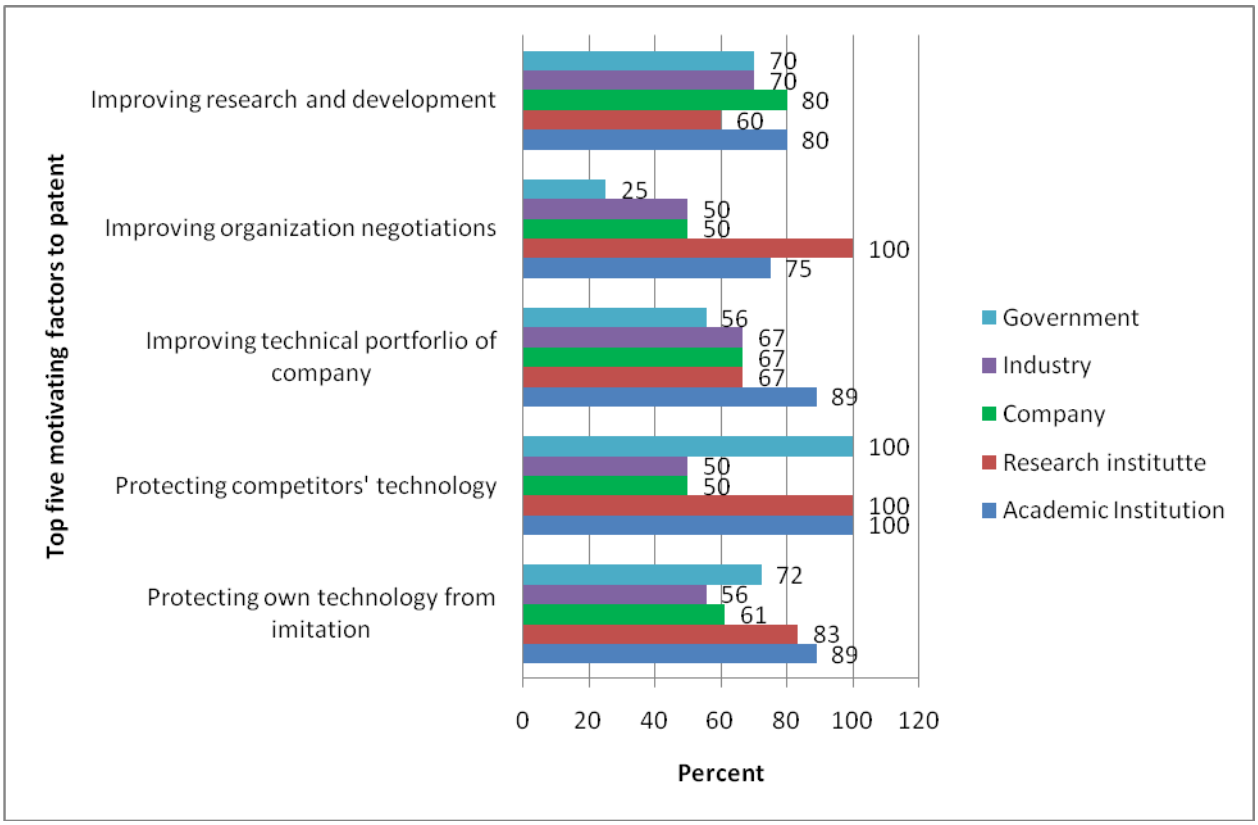


Figure 4: Respondents' motivations for patenting inventions

When the top five motivating factors to obtain patent rights were classified by the respondents' institutions the result of the analysis show that for those in the academic institutions, their majors motivating factors were: protecting invention from competitors (100 percent) and to protect their technology from immitation (89 percent), whereas for those in research institutions protecting inventions from competitors (100 percent) and improving the organizations negotiation (100 percent) were their major motivating factors. Improving research and development (80 percent) and improving the technical portfolio of the company (67 percent) were the major motivating factors for the company or those working in the company.



Notwithstanding the awareness of use of patent rights to protect inventions and the motivation to patent inventions, the respondents were asked to state what difficulties they encountered in the process of obtaining the patent. Among the difficulties highlighted by the respondents were dealing with the overly complex licensing negotiations (21 percent), the high individual royalties (28 percent), necessary patent not licensable (10 percent) and breakdown in licensing negotiations (17 percent) (Figure 5). Others (24 percent) encountered other difficulties including cost of patenting, fees for obtaining the patent and schepticism of anticipated maintenance costs.

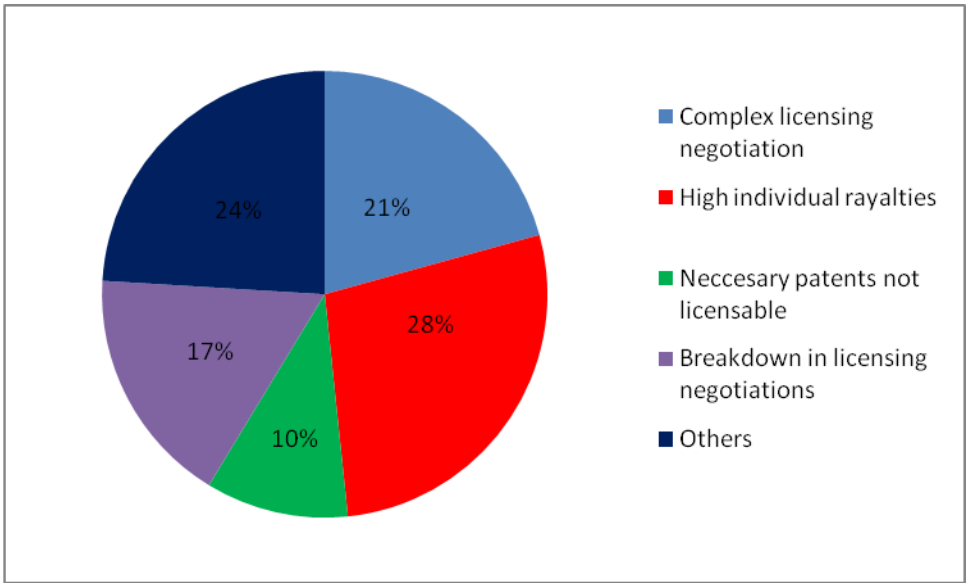


Figure 5: Difficulties encountered by patent applicants

In addition to perceived difficulties in acquiring patent rights, the respondents were prompted to explain how often they had experienced certain problems inherent with the patent system. A five-point Likert scale was used as follows: 1= never; 2 = rarely; 3 = sometimes; 4 = often; and 5 = very often. The responses of the participants are shown in Table 1 below. This table shows that the problems experienced (rarely to very often) were: unawareness of research staff about patenting (68.5 percent); patents blocking access to technologies (51 percent); difficulties to enter a technological field because of too many patents (53 percent), and patents hampering research disputes (51%).

Table 1: Respondents' problems with the patent system

Problems with patent	Never		Rarely		Sometimes		Often		Very often		Total	
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Unawareness of research staff about patenting	28	31.5	6	6.7	22	24.7	12	13.5	21	23.6	89	100
Difficulties to enter a technological field because of too many patents	35	47.3	11	14.9	13	17.6	6	8.1	9	12.2	74	100
Patents blocking access to technologies	38	49.4	10	13.0	10	13.0	9	11.7	10	13.0	77	100
Patents impeding further research and development	38	53.5	8	11.3	10	14.1	8	11.3	7	9.9	71	100
Conflicting and overlapping patents	38	52.1	10	13.7	13	17.8	7	9.6	5	6.8	73	100
Dependency on previous patents	38	52.8	16	22.2	8	11.1	6	8.3	4	5.6	72	100
Patents hampering research disputes	36	48.6	10	13.5	15	20.3	7	9.5	6	8.1	74	100
Proliferation of legal patenting disputes	40	57.1	7	10.0	6	8.6	9	12.9	8	11.4	70	100
Over-complex patent licensing negotiations	40	57.1	10	14.3	8	11.4	4	5.7	8	11.4	70	100
Breakdown of patent rights negotiations	40	59.7	7	10.4	6	9.0	8	11.9	6	9.0	67	100
Individual royalties are too high	39	56.5	6	8.7	9	13.0	8	11.6	7	10.1	69	100
Accumulation of too many royalties	40	61.5	8	12.3	8	12.3	4	6.2	5	7.7	65	100

3.4 Importance of Patents

To determine the participants' perceptions of the importance of patent rights, they were asked to rate how important patent rights were to themselves, their institutions, companies or industry in some outlined contexts for Botswana (Figure 6). A four-scale rating was used as follows: 1= Not important; 2=modestly important; 3= important; 4 = very important.

Figure 6 shows that between 42 and 50 percent of the participants were of the opinion that patent rights were very important for assessing the level of innovation in Botswana (50 percent), for public funding of research (45 percent), co-operation with other companies/institutions (43 percent), but less important (not important or modestly important) for commercialization of research output (50 percent) and the number of scientific publications (33 percent).

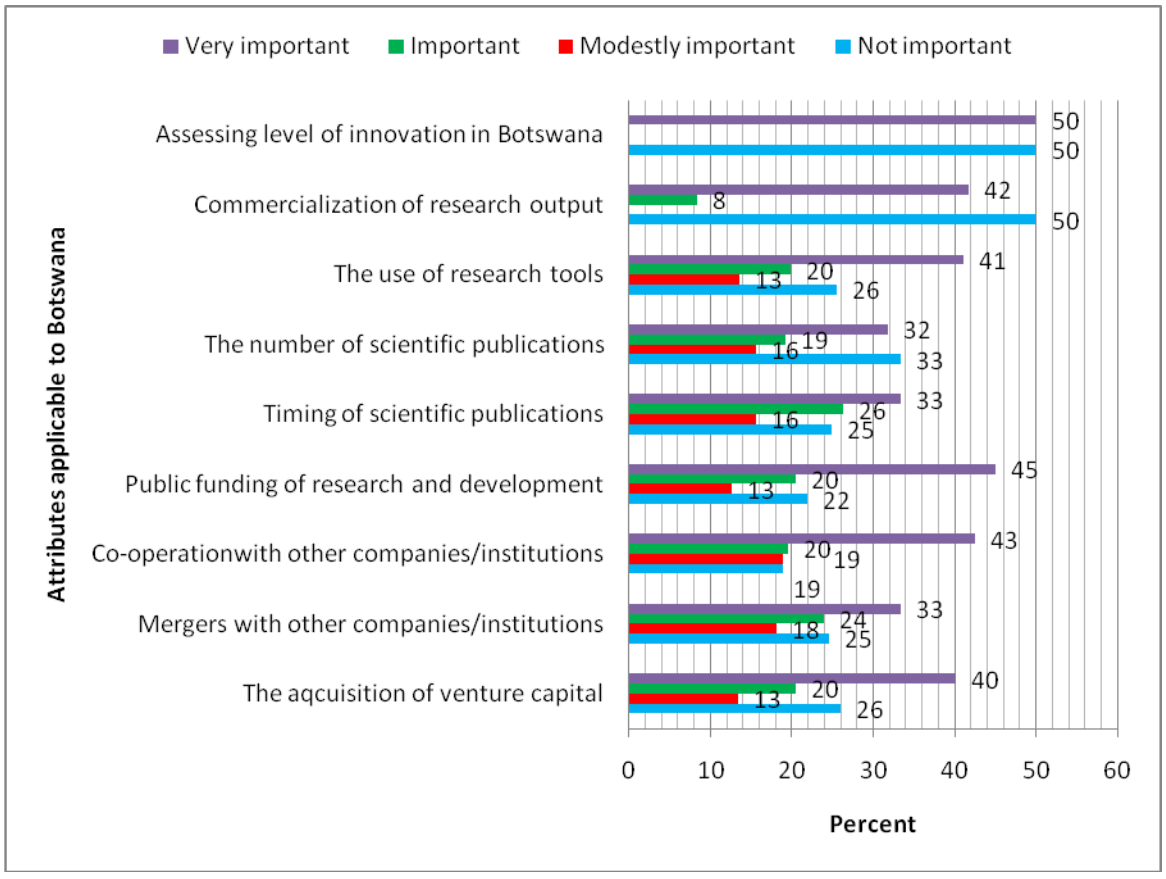


Figure 6: Participants' assessment of the importance of patents in different contexts

3.5 Ways in which Patenting has Affected Research Capacity

When asked in what ways patenting has affected research capacity, 59 percent of the respondents stated that in order to obtain patent rights scarce resources were diverted to inventions that can be patented and material acquisition for research had become increasingly difficult and costly. About 46 percent of the respondents felt that patenting hinders progress because: (i) it provides disincentive for other persons to improve on patented inventions, (ii) the pace of research innovations slows down substantially because of the activities of patent holders and (iii) patenting increased the cost of downstream researches. In addition, 41 percent were of the view that innovations were affected because researchers were now restricted to areas without patent rights; transaction costs become unaffordable to researchers; researches infringing on patent rights attract damage costs as well as licence fees, and in some cases researches have been abandoned because of difficulties in arranging overlapping patents (N=22), (Figure 7).

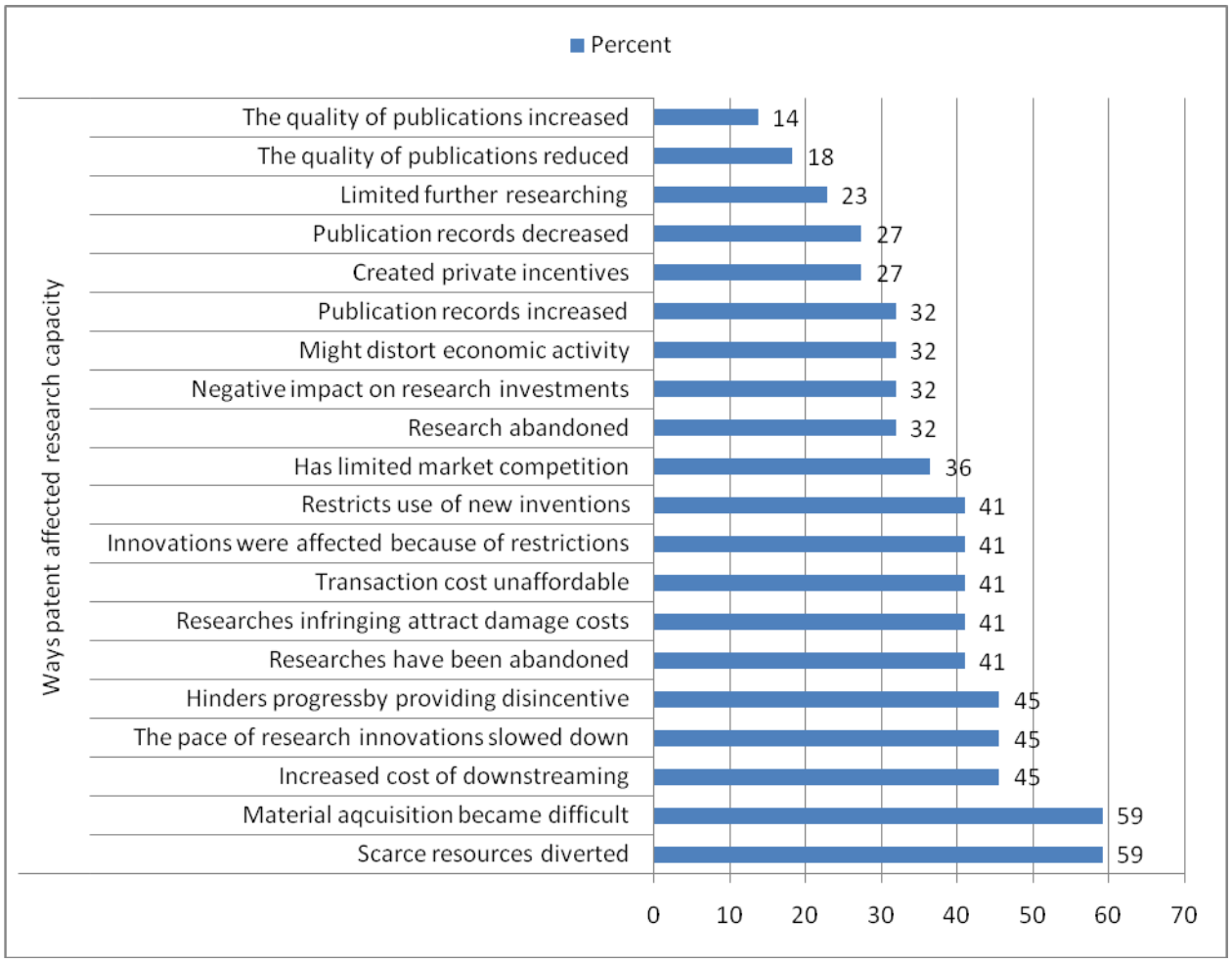


Figure 7: Respondents' views on how patenting can affect research capacity

3.6 Research Exemptions

As a result of existence of patent of certain inventions, knowledge acquisition and innovations in such areas are restricted. However, the exclusive rights given to a patentee does not research or experimentation especially when it is not commercial oriented.

3.6.1 Awareness of research exemptions

The respondents in this study were asked if they were aware that they, their institution, or company could conduct their researches or experiments on patented inventions without infringing on the rights of patentee to their inventions. The responses which were based on "Yes"

or “No” show that a majority of the respondents (54 percent) were unaware and only 36 percent indicated that they were aware that research exemption can enable them to use patented inventions.

On whether they know the procedure for invoking research exemption, only 9 percent stated that they knew the procedure while an overwhelming majority (82 percent) did not know the procedure for invoking the exemption.

A further investigation on the reasons for invoking research exemption for use of patented invention revealed that a majority (73 percent) wanted to be free to use every desired tool for their research on the patented inventions, while 65 percent of the respondents did not want to infringe on the rights of the patentee. The other reasons given by over half of the respondents was the desire to avoid putting their company to ridicule (54 percent) and the fact that their researches involved patented inventions (51 percent) (Figure 8).

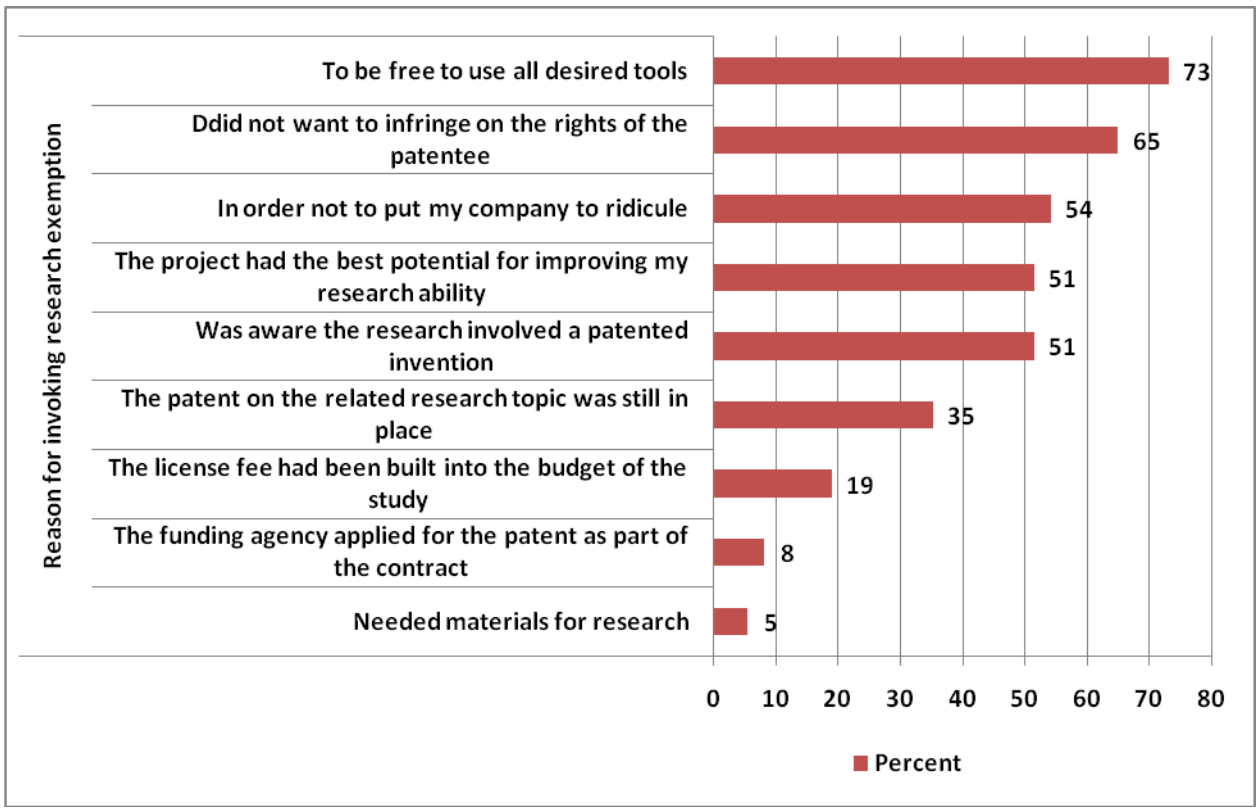


Figure 8: Reasons given by respondents for invoking research exemption

3.6.2 Universities, research institutions and research exemptions

The respondents were asked whether in their opinions, universities and research institutions should be granted research exemptions statutorily. The responses show that while 77 percent were in support of granting universities and research institutions statutory research exemptions, 9 percent felt it was not necessary. The reasons given for granting statutory research exemptions were: (i) That research helps to verify the truthfulness and accuracy of patent claims (91 percent); (ii) Research is used for comparison to a new technology (88 percent); (iii) Research is used for classroom teaching (81 percent); (iv) Research is used to develop new research tools donated to the public (80 percent) and (v)Research is used to gain scientific knowledge with no foreseeable commercial application (75 percent) (Figure 9) (N=267).

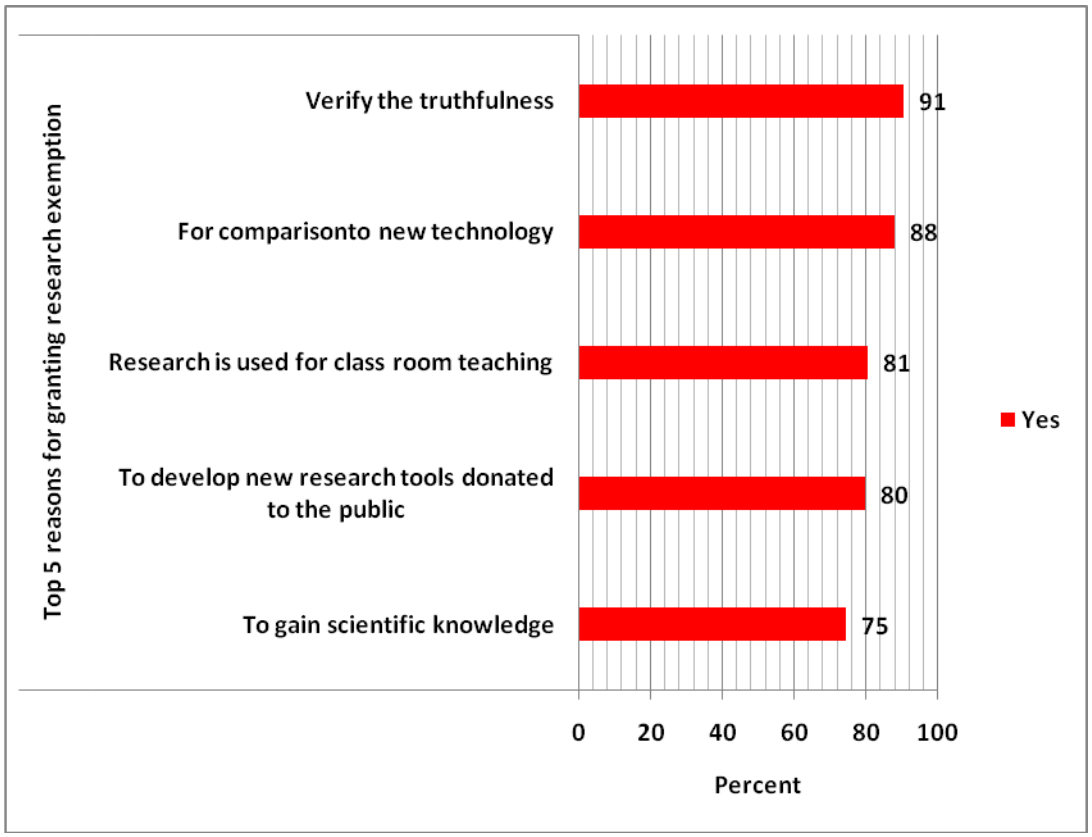


Figure 9: Reasons given by respondents on why universities and research institutions should be granted research exemptions

Since many of the respondents advocated for the statutory granting of research exemptions to universities and research institutions in Botswana, they were asked what issues that could arise in formulation of statutory research exemptions. Their responses are shown in Figure 10. The figure shows that a majority of the respondents (74 percent), considered as the most important issue, the nature of the patented invention and whether the research is to be used to test for the validity of the patent. Other issues considered important included the motivation of the researcher to invent (73 percent), the type of use of the research (to experiment on or experiment with) (69 percent), development of effective competition (67 percent), the legal framework of the patent(whether there is option for compulsory or statutory license) (67 percent), whether the research is to invent around the patented invention (67 percent), and whether the research is for profit or not-for-profit (67%) (N=301).

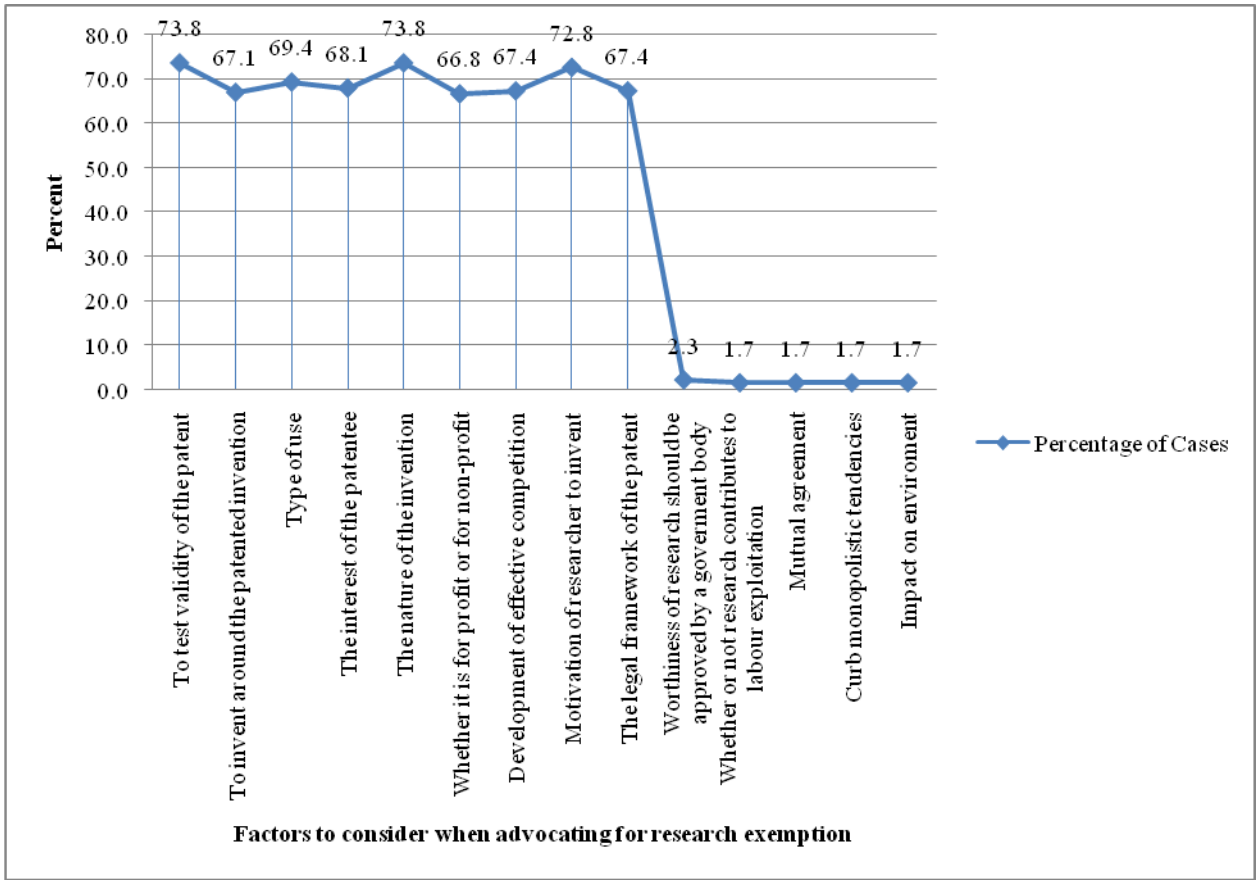


Figure 10: Factors that the respondents considered before advocating for research exemptions.

3.6.3 Ways in which research exemption can affect research capacity and utilization

On the bases of the responses of the participants in the previous section, it is clear that for research exemptions (statutory or non-statutory) to be granted certain considerations need to be given to the issues at stake. These issues affect the magnitude or way the reseaches are conducted, namely, to investigate the objectives of the invention to determine whether it is to, improve upon it, or to create a new product or process.

3.6.4 Research capacity (N= 289)

The respondents were asked about their perceptions of how the granting of research exemptions could affect research capacity in the institutions, companies and industries in Botswana. Their responses are shown in Figure 11. The responses show that 79 percent of them felt that with the granting of research exemptions, transaction costs involved in multiple licensing will be removed from research costs making it easier to fund researches, certain studies with high potential for PhD and Masters degrees will be undertaken (78 percent), researches which had been abandoned because of difficulty in arranging overlapping licenses will be resuscitated (75%), many researchers will undertake researches of their own interests in certain topical areas (73 percent), and researchers will no longer be secretive with information from their studies (69 percent). Other views on the direct impact of granting research exemption are that because of the absence of damage costs as well as ongoing license fee for future use of inventions which are usually paid when patent rights are infringed, researches will costs less (66 percent). In addition, researches will be conducted irrespective of uncertainties in the output (65 percent).

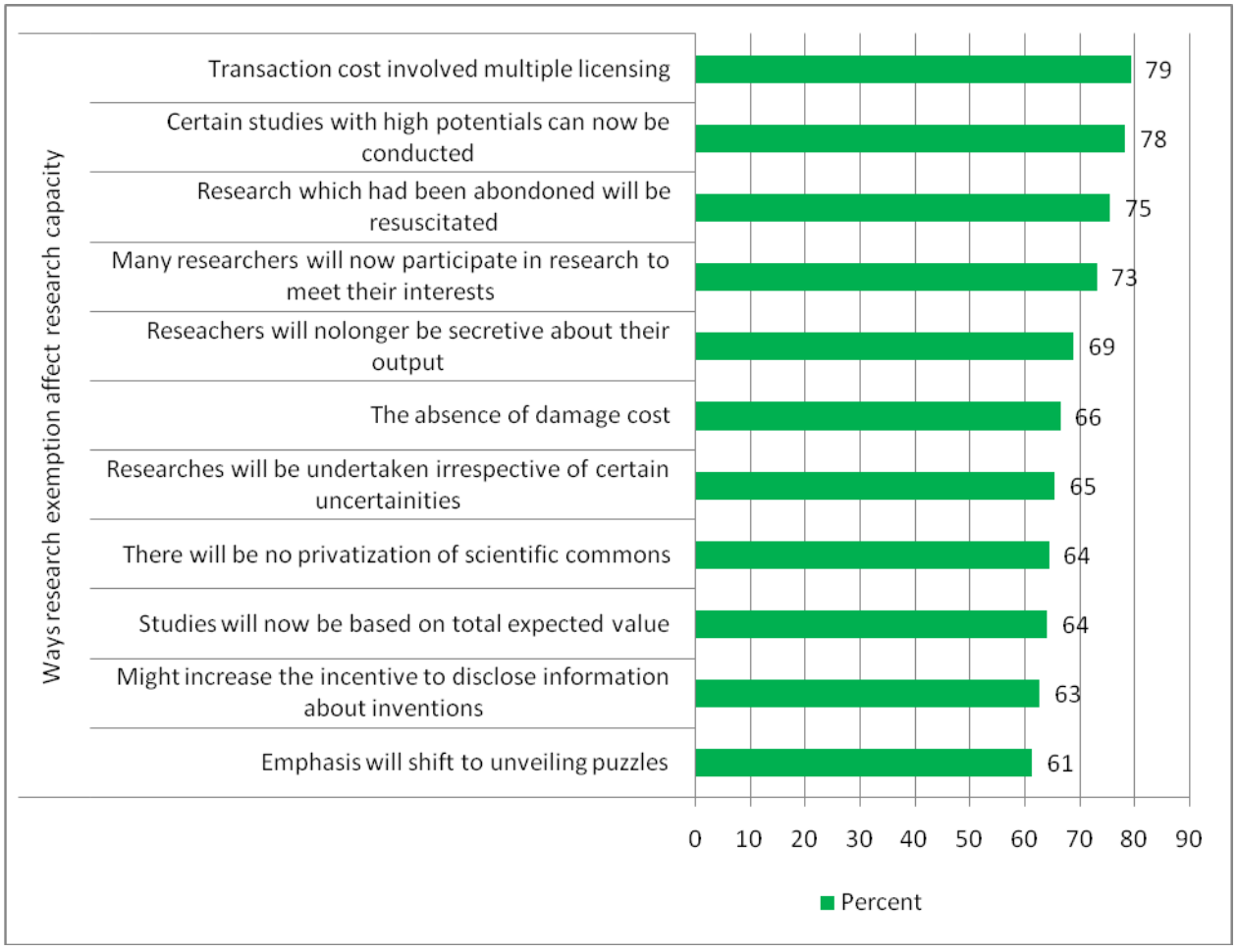


Figure 11: Respondents' perceptions of the ways in which research exemption can impact on research capacity.

3.6.5 Research utilization (N= 292)

Figure 12 shows the perceptions of the respondents on how research exemption can affect research utilization in the universities, research institutions, companies and industry in Botswana. An overwhelming number of the respondents (85 percent), were of the view that the granting of research exemption would facilitate the ready availability of research outputs for scientists to improve on or extend, while 77 percent felt that knowledge will be expanded to users more generally and 72 percent believed that the rights attached to a patent will be restricted to specific classes of action rather than the more general "use" or "exploit" where those classes do not include research uses. The other ways identified by the respondents in which research exemption can affect research utilization include: improvement of application and adaption of inventions in a different technological area (67 percent), the ease to subsidize the process of inventing around the patent (64 percent), and providing information to assist in prosecuting a patentee who had acquired an invalid patent (63%).

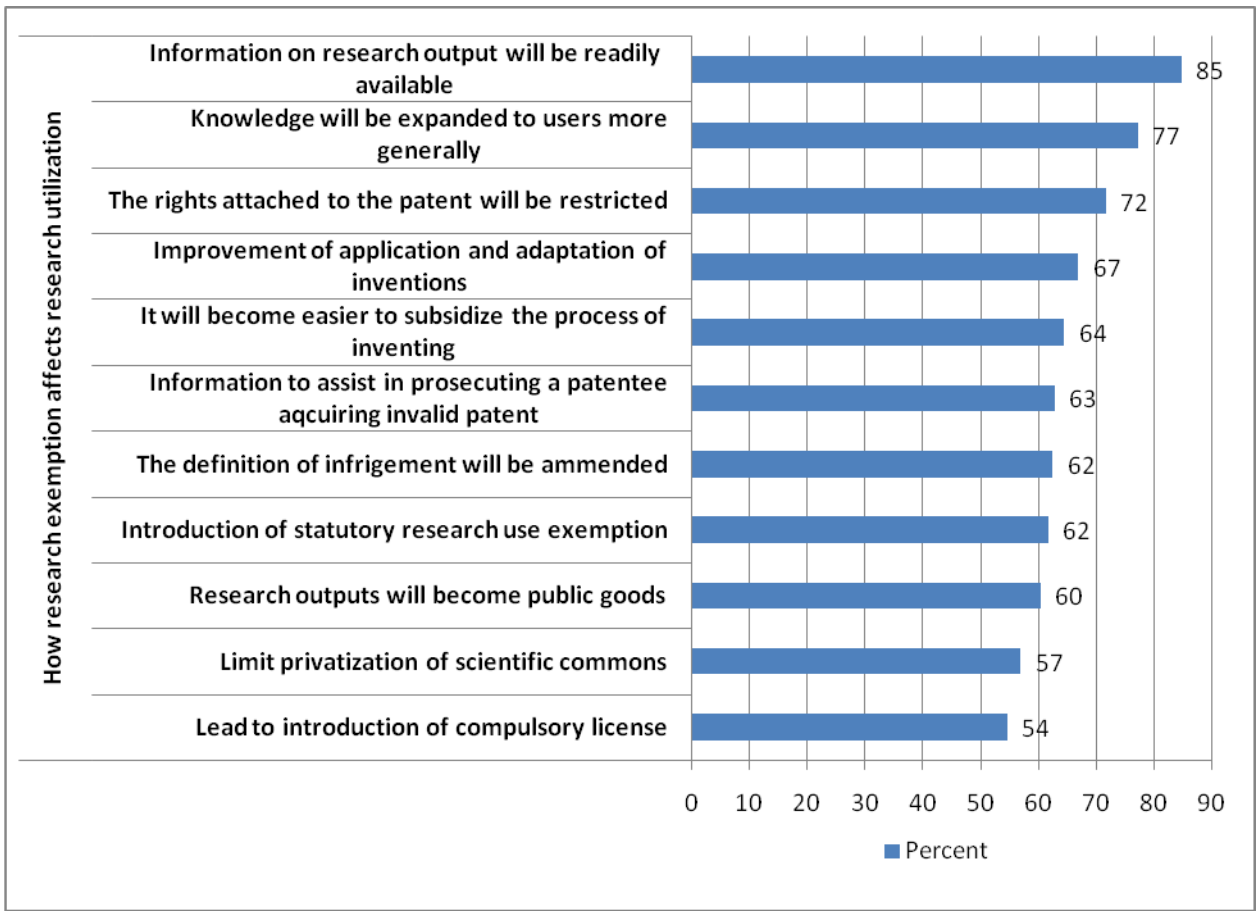


Figure 12: Respondents' perceptions on how research exemption can affect research utilization

3.6.6 Incentive to invest (N=275)

When asked how the invoking of research exemption can affect the incentive to invest in research, majority of the respondents (78 percent) were of the opinion that consumers will prefer to go for the new and improved competing technology when it becomes available, thereby leading people or organisations to invest more in the new technology or process. Between 70 and 73 percent considered that free use of patented technology would increase the probability of developing new or improved competing technology with subsequent losses on the old technology (73 percent) and increase research output in terms of quality and quantity (70 percent).

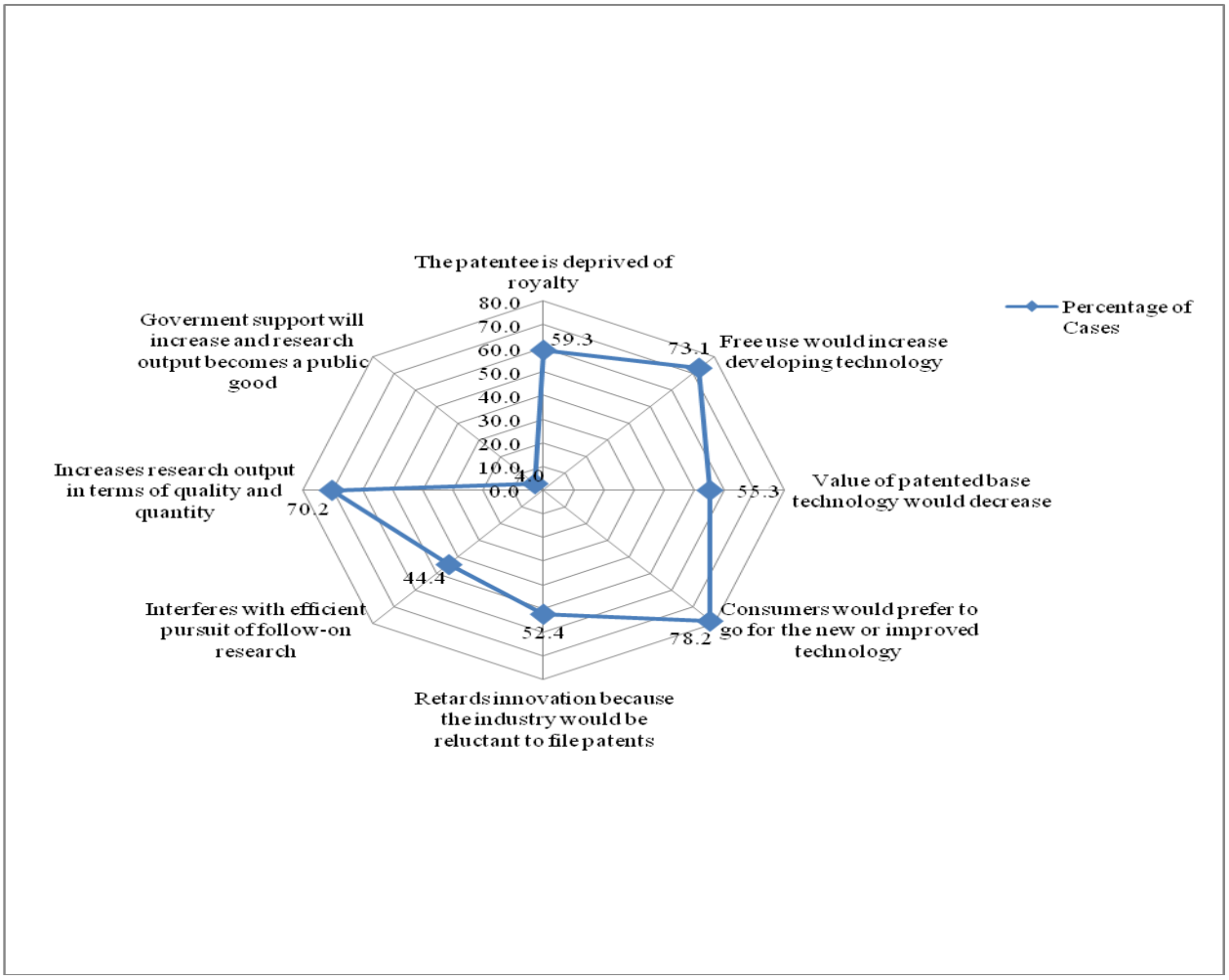


Figure 13: Respondents' perceptions on the effects of research exemption on the incentive to invest in research.

3.7 Extent of Support to Research in Botswana

In order to understand the extent of support given to research by the different institutions, organizations and industries, the respondents were asked to indicate the type of research they conducted, the number of times they had been involved in each type of research and the type of support they received (that is whether the research was externally funded, internally funded, or received out of pocket support). The responses are shown in Figure 14.

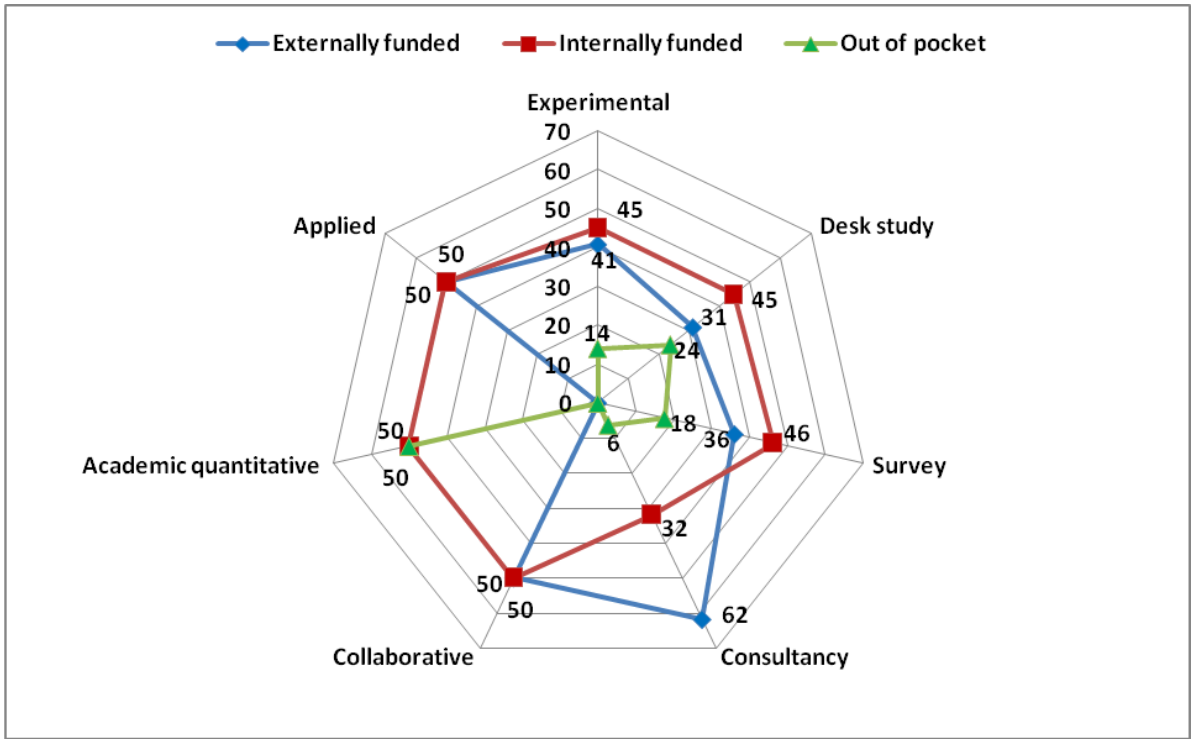


Figure 14: Percentage of respondents who indicted the type of research they conducted and sources of support for the research

Figure 14 shows that most of the researches are internally funded except for consultancies where 62 percent of the respondents involved indicated that their funds were generated externally.

Furthermore, the respondents were asked to rate the level of support given to research by the Government of Botswana, their respective institutions or organizations and collaborating agencies or external funding agencies. The responses have been shown in Figure 15.

Figure 15 shows that an overwhelming majority of the respondents (over 80 percent) felt that support given to research was very inadequate, while about 19 percent of them thought that it was inadequate.

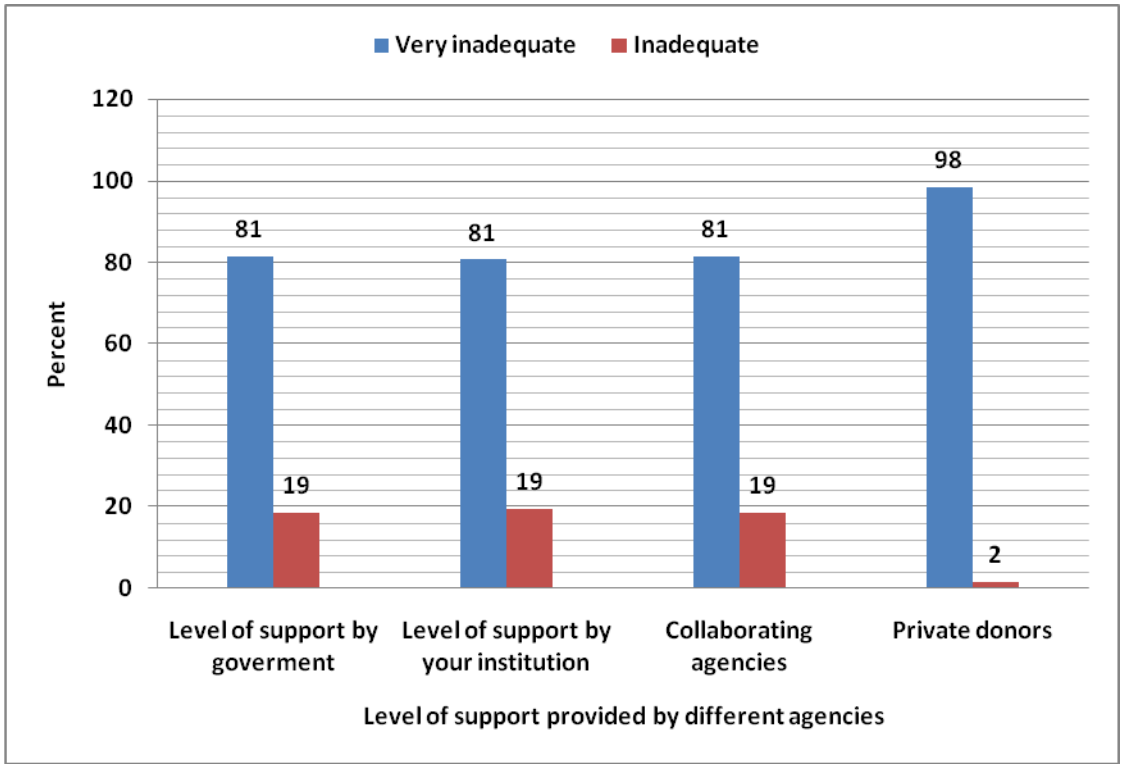


Figure 15: The respondents' perceptions of level of support given to research by various agencies

The respondents were mainly dissatisfied with the level of support coming from private donors followed by that from the Government of Botswana and its collaborating agencies.

When asked how research can be made more attractive, a small majority of the respondents (39%) were of the opinion that funding of research should be increased and incentives should be given to researchers for publishing their research reports or articles generated

from those reports (24 percent). The other expressed views were that all stake-holders should be involved in encouraging research (10%), workload, especially in the academic institutions, should be reduced to allow staff more time to get involved in research (7.6 percent), and that researchers should be granted access to data-base or support materials for research (7.6 percent) (Figure 16) (N= 224).

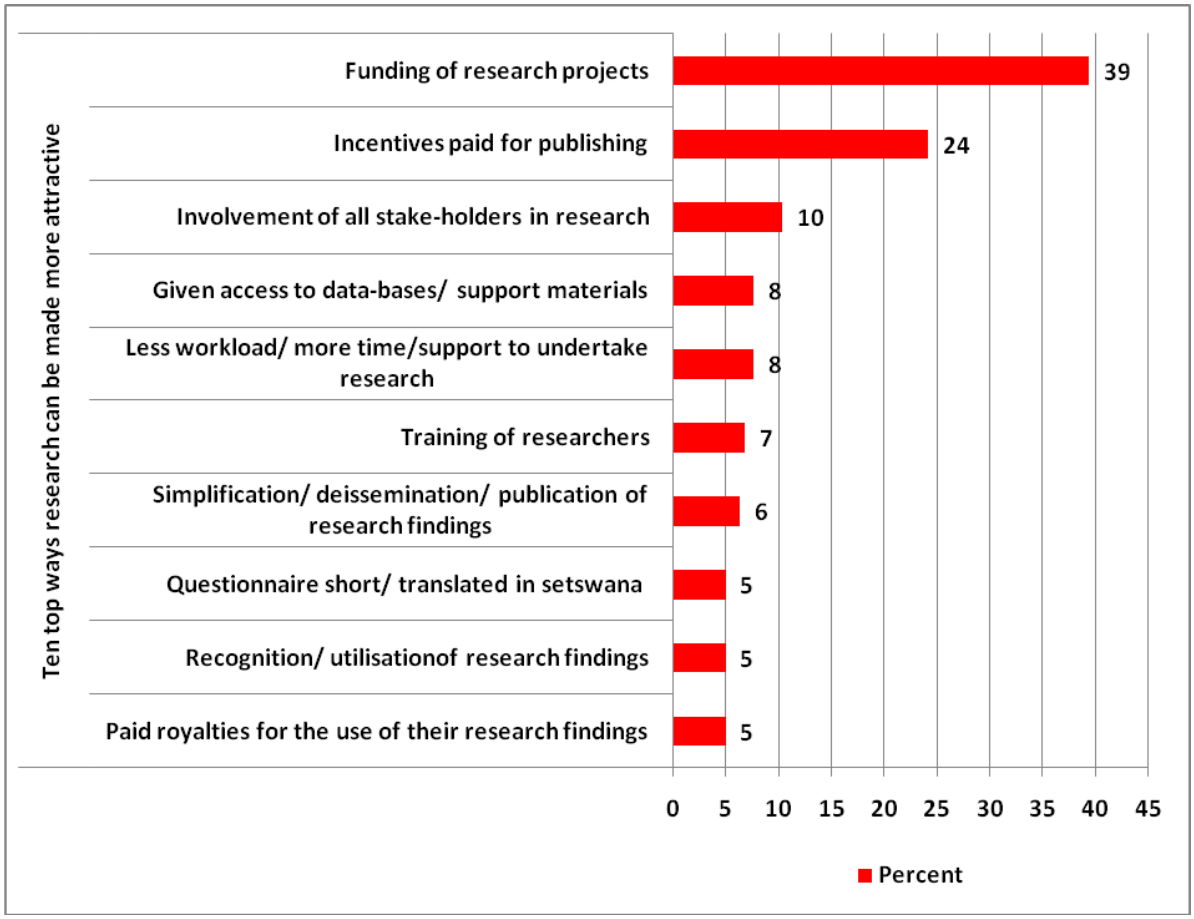


Figure 16: Respondents' views on how research can be made more attractive

3.8 Challenges of Patent to Research

The opinions of the respondents were solicited on what they considered were the challenges they were facing in their various researches as a result of patenting of certain inventions.

The responses are summarized in Figure 17. This figure shows that the most pressing challenges to the respondents were unawareness of conventions/laws governing patent practices (25 percent), inadequate information on the patents, ownership of patent rights or desired rates for application of patent (24 percent), restricted access to patent information (22 percent) and delay in processing research exemptions to use patented inventions which slows down research (16 percent).

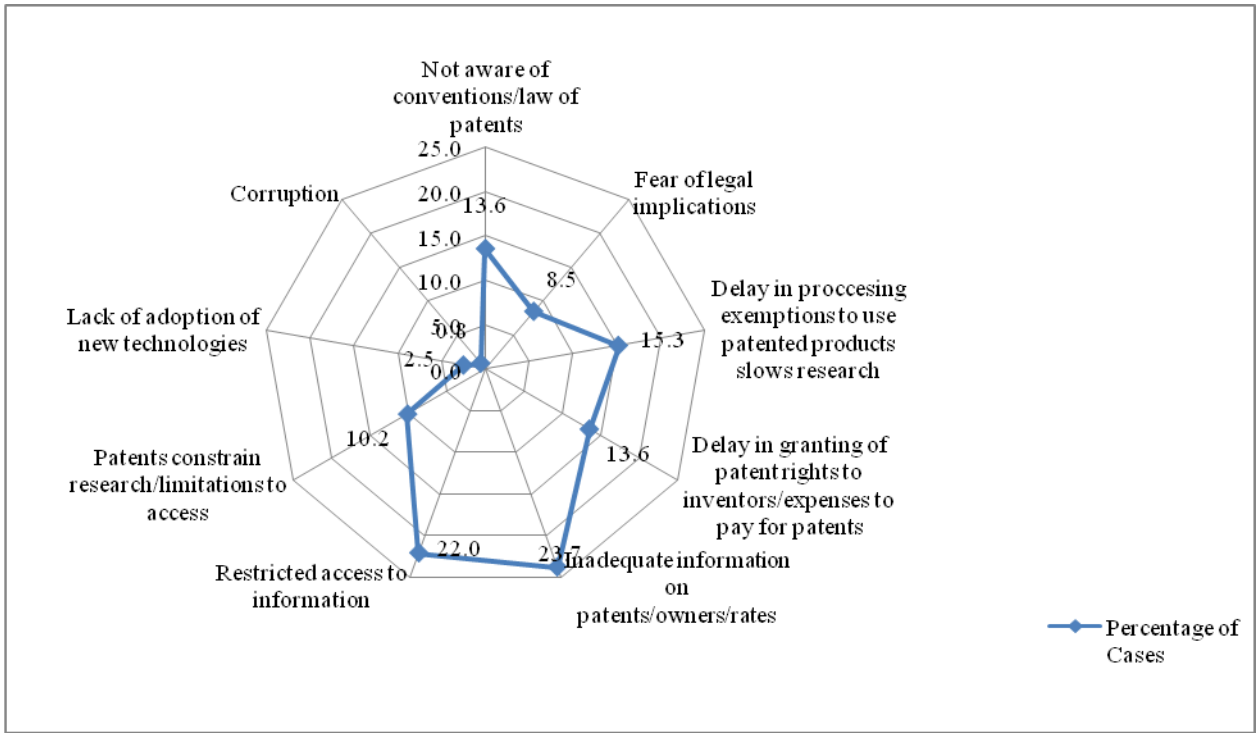


Figure 17: Respondents' perceived challenges to advancing research as a result of patented inventions.

When prompted on how these challenges can be overcomed, the respondents indicated that institutions or organisation including industry should sponsor or fund the process of patent exemption; institutions or organizations should provide information as well as train researchers on patent procedures; and the time and procedure to invoke exemption should be reduced.

3.9. Analysis of Secondary Data from the Registrar of Companies

Data on the number of registered patents in Botswana were collected from the Registrar of Companies and is shown in Figure 18. The figure shows that the periods 1971-2000 witnessed the highest number of registered patents in Botswana and began to drop from 2001.

A fourth order polynomial trend fitted to the number of registered patent within the study period showed a very good fit with coefficient of determination value of 98%. The curve predicts the likelihood of a future rise in the patent registration in the near future.

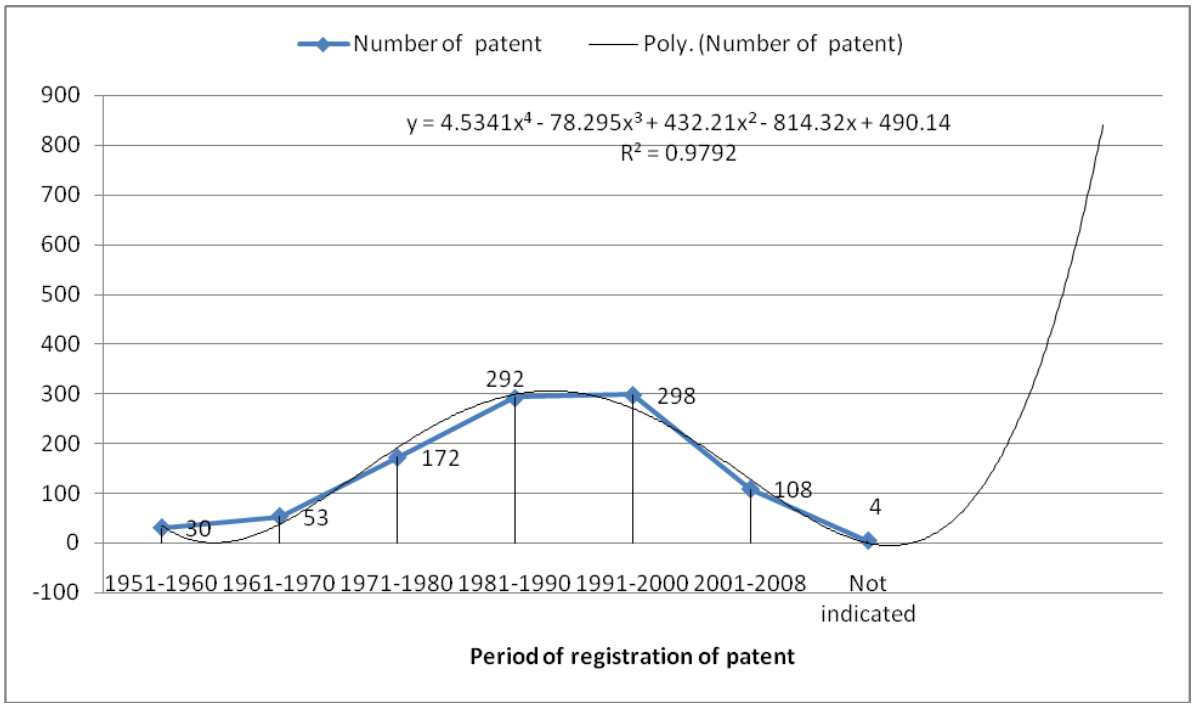


Figure 18: The number of registered patents classified by period of registration

When classified by the priority countries, the data (Table 2) show that most of the patent applications originated from South Africa (45%), USA (16%), and Great Britain (13%). Patent applications emanating from Botswana were extremely low (0.5%).

Table 2: Registered patents classified by priority countries

Priority Country	Number of registered patent	%
Australia	29	3.0
Belgium	1	0.1
Botswana	5	0.5
Canada	11	1.1
China	4	0.4
Denmark	6	0.6
Finland	2	0.2
France	19	2.0
Germany	31	3.2
Great Britain	120	12.5
Greece	1	0.1
Italy	6	0.6
Holland	1	0.1
Hungary	2	0.2
Israel	7	0.7
Japan	1	0.1
Korea	1	0.1
Luxemburg	4	0.4
Malaysia	1	0.1
New Zealand	2	0.2
Norway	1	0.1
South Africa	432	45.1
Swaziland	1	0.1
Switzerland	9	0.9
Netherlands	2	0.2
USA	154	16.1
Zimbabwe	9	0.9
Not indicated	95	9.9
Total	957	100

4. Discussion of results

This study focussed mainly in trying to explore the current patent regime in Botswana, its awareness, utilization by individuals, researchers and organizations including academic institutions and industry, and any foreseeable problems of patent rights that might inhibit researches in the country.

The study sample constituted individuals drawn from Universities, Research institutions, Ministries, organisations and industries from Botswana. About 45 percent of the participants were from academic institutions, 16 percent from government establishments, 15 percent from the companies and about 5 percent from industry. The study showed that about 67 percent of the studied sample was aware of the use of patent rights to protect invention, while 69 percent of research staff were unaware of patent system. This level of awareness is quite low and points to the need to continue to raise awareness of the patent regime and its utilization. Encouragement of awareness training in the uses of patents and invoking of IP rights during the entire research and innovation process and to raise awareness among academics about the commercial potential of their research are highly recommended.

The study revealed that only 8 percent (n=29) of the sample had applied for patents. This low percentage is also reflected in the registered patents in Botswana which showed that only 0.5 percent of all registered patents from 1951 to 2008 were from Botswana. As indicated by participants during the Focus Group Discussion (FGD), many of the applications submitted by locals (residents of Botswana) were rejected because of lack of clarity in presenting their applications and not necessarily because they lacked content. The need for assistance of a patent attorney or agent who will represent their interests during the application process was therefore recommended so as to improve acceptability of local patent applications.

For those who had applied for patent, the study has showed that the sponsored research agreement (62 percent) and exclusive license (69 percent) were the most widely used methods to protect their inventions, while 44 percent used confidentiality agreement and 31 percent used the material transfer agreement.

Although there are very many reasons why individuals, research institutions and industries apply for patent but this study has shown that the desire to protect one's technology from imitation and to prevent competitors from patenting the products ranked highest among the participants. This view is also supported by Thumm (2003), who showed that the classical, defensive motive of protecting one's technology from imitation and preventing competitors' patenting and application activities were the most motives for the Swiss scientists.

The patent system is important for assessing the level of innovation in Botswana (50 percent), for public funding of research (45 percent), and co-operation with other companies/institutions (43 percent), but less important (not important or modestly important) for commercialization of research output (50 percent). Thus the participants placed higher value on patents in the context of scientific innovations and as a major determining factor in the funding of research than as a means of creating cooperations with other companies and institutions and commercializations of research output. This result is not suprising because funds for research are not easy to come by and for those who have funds their emphases will be on innovativeness of the research output which will provide opportunities for further funding. The results run contrary to findings by Thumm (2003) who found that funding research and development were less important. It however, shows differences in priorities attached to different concerns in the research process.

A little less than half of the participants in the study had indicated that, notwithstanding its importance in advancing research innovativeness and attraction of research funds, patenting hinders research progress by (i) providing disincentive for other persons to improve on patented inventions, (ii) slowing down substantially the pace of research innovations because of the activities of patent holders and (iii) increasing the cost of downstream researches. It is in this regard that statutory research exemptions need to be considered in

Botswana so that it can open up the possibilities of researchers delving into patented products for not-for profit researches, create incentives for downstream researches and reseach innovations. As Dent(2006) puts it, " Optimal public innovation policies are designed to achieve the optimal balance between the incentive to invest in inventive activity on the one hand, and the unfettered diffusion of knowledge on the other."

The major difficulties encountered by the respondents in applying for patenting their inventions were because the patent involved overly complex licensing negotiations (47%) , high individual royalties (47%) and breakdown in licensing negotiations (29 percent). It is worth noting that for many research grants, no budgets are provided for the payment of royalties or license fees to owners of patents. Thus the issue of additional cost involved through payments of the license merely add costs to doing research and prolong the time for the research as so much time is lost in negotiating for complex licensing fees. All these add to the frustration of conducting research and affects efficiency. However, it further strengthens the case for research exemptions in academic and research institutions in Botswana where researches are mostly for knowledge case and not for commercializations.

About three in every five respondents indicated that in the bid to obtain patent rights researchers divert scarce resources to inventions that can be patented, making it more difficult to acquire materials for research whose costs are exhorbitant. In addition, close to half of the respondents felt respectively, that patenting hinders research capacity by (i) providing disincentive for other persons to improve on patented inventions, (ii) reducing the pace of research innovations because of the activities of patent holders and (iii) increasing the cost of downstream researches. These findings are not to the advantage of the developing countries' research institutions and researchers and calls for policies that would enhance the research process while ensuring that patent owners enjoy the fruits of their efforts and innovativeness, and do not have a damaging effect on the incentive to invest.

Research exemption for patented inventions allows researchers to use an invention without infringing the rights of the patent holder of the invention. Such exemption reduces the impact of the losses associated with the grant of monopoly rights over the inventions by the

government of the country. Without an exemption, scientists, researchers and universities can be sued for patent infringement if they make use of patented invention in the course of their research. Awareness of research exemptions, its utility, and method of applying for it was poor as over half the respondents indicated lack of knowledge. Even more worrying was the lack of knowledge of procedure to invoke it. This calls for training of researchers and a public awareness creations on research exemptions, and the provisions made in Article 30 of the TRIPS Agreement and the three-steps test and "Bolar exceptions".

The study showed that over seventy-five percent of the respondents were convinced on the need for universities and research institutions to enjoy statutory research exemptions and reasoned that research exemptions will help researcher to verify the truthfulness and accuracy of patent claims, aid in the comparison of old and new technologies, teach new areas of study and develop new research tools in addition to gaining scientific knowledge with no foreseeable commercial application. These results agree with the list of permitted experimental uses provided by Canada (WTO, 2000) in its argument before the World Trade Organisation (WTO) in a dispute with European Union (EU) on the protection of Pharmaceutical products, namely: (a) testing an invention to determine its sufficiency or to compare it to prior art; (b) tests to determine how the patented invention worked; (c) experimentation on a patented invention for the purpose of improving on it or developing a further patentable invention; (d) experimentation for the purpose of "designing around" a patented invention; (e) testing to determine whether the invention met the tester's purposes in anticipation of requesting a licence; and (f) academic instructional experimentation with the invention. Merton (1973) argued that basic research should not be guided by economic and commercial instrument but should include: (a)The immediate publication of findings for use by all, and (b) The pursuit of truth rather than self-interest.

Building research capacity through utilization and expansion of existing research information in the academic academic and research institutions represent some of the key goals of these institutions. As was found in this study many respondents saw the existence of patents as impediment to achieving these goals and research exemptions as a measure to minimize the effect of patent system. In particular over three in every four participants

believed that research exemptions will drastically eliminate transaction costs involved in multiple licensing from research costs making it easier to fund researches. Certain studies with high potential for PhD and Masters degrees will be undertaken, and researches which had been abandoned because of difficulty in arranging overlapping licenses will be resuscitated. The number of research activities will drastically increase. Ready research outputs will be made availabile for scientists to improve on or extend, while knowledge will be expanded to users more generally and the rights attached to a patent will be restricted to specific classes of action rather than the more general "use" or "exploit" where those classes do not include research uses. In a continent like ours where government support for researches is minimal and research discipline in terms of fact finding to improve the life of people is minimal, the introduction of patent system in its strictist sense, without research exemption will be detrimental to research incentive. However, invoking research exemptions by institutions will free use of patented technology and increase the probability of developing new or improved competing technology with subsequent losses on the old technology in addition to increasing research output in terms of quality and quantity.

The most pressing challenges of the patent system to the respondents were unawareness of conventions/laws governing patent practices, inadequate information on the patents, ownership of patent rights or desired rates for application of patent, restricted access to patent information and delay in processing research exemptions to use patented inventions which slows down research. These findings which were also expressed by particpants during the Focus Group Discussions, particularly representatioves of Department of Registrar of Companies, calls for immediate intervention measures by academic and research institutions, and the Government of Botswana for training on the patent system, its utilization and implications for research.

5. RECOMMENDATIONS

The ratification of most of the international IP conventions by Botswana, followed by the enactment of many pieces of legislation in this area, particularly in the last decade underscores the Government's recognition of the growing importance of IP rights to the economy. However, the existence of a legal framework on its own is not sufficient. It is the effectiveness of this legal framework that matters. The objective of this study was therefore to examine the challenges in the specific area of patents and research exemptions to research capacity and utilization in universities, research institutions and industry in the country. No similar study has ever been undertaken in any underdeveloped country like Botswana. From our analsysis and review of the imperical findings gathered through questionnaires and FGDs, a number of interesting conclusions can be drawn.

First, the level of patent awareness and possibly IP awareness in the country generally is low. Most researchers, whether in the academia or in industry, claim some awareness about the existence of patents but on closer questioning, it becomes clear that such knowledge is usually very superficial. The existence of the legal framework dealing with patents and its attempts to provide incentives and promote research and innovations, especially through research exemptions will fail to achieve this objective when the awareness level of either the existence of IP laws or the effect of this law on their activities is low. This is particularly worrying when it pertains to people such as researchers whose principal acivity must be to innovate. The following measures are suggested to deal with these problems:

i) The IP Unit in the relevant ministry needs to adopt a more proactive role by sensitising people, especially those whose activities may result in inventions, about their IP rights, how thse can be protected, the advantages of doing this and the procedure for doing this. Information literature contained in leaflets and other types of flyers should be widely used.

ii) The Tertiary Education Board, which is the supervisory body for education in the county needs to formulate an IP policy which should guide all the tertiary institutions in the country.

Second, whilst it is clear that the existing legal framework recognised and protects patents, the nature and scope for encouraging research use of patented inventions through research exemption is less clear. A wide variety of options are available for addressing the problems associated with experimenting with patented products. It is strongly recommended that legislation introducing an experimental use exemption should be introduced to encourage research and innocation with respect to patented products. The aspect of the Intellectual Property Act dealing with research exemption should be more explicit and define in concrete terms specific exceptions for "experimental purposes". This is particularly important not only because the present legislation is vague on the issue but also because it is uncertain whether there are any relevant and applicable common law rules.

Third, even in those instances where people were aware of patents, there appears to be no incentives to innovate because of a number of constraints. Some of these constraints can be addressed by the following measures:

i) The Government, tertiary institutions and industry must be compelled to allocate funds for research and innovation. This might actually require specific research and development departments to be created.

ii) Financial incentives, possibly through a 50/50 sharing of royalties from patents should be introduced.

iii) Academic institutions should device well-publicised schemes to recognise and reward innovative initiatives by staff.

Finally, the process for registration of patents is fairly standard and complex. Nevertheless, it could be simplified and the Registrar should be ready to assist those who need assistance.

Overall Assessment of the Project

Contributions to development: The project took the research team to various parts of the country, research institutions and industries. It offered us an opportunity to interact with individuals, institutional heads, and researchers on the issue of patent regime and research exemption. At the diamond mine in Jwaneng, Botswana, for instance, the research team gave a presentation to the team of researchers in the mine. At the end of the talk they became more conscious and aware of how they could utilize their inventions to advance their economic base and those of the institution. The Focus Group Discussions further gave the team of researchers a first hand opportunity to find out what people really know about patent and research exemptions. The series of discussions that went on dring the meeting further developed participants knowledge on the patent regime and research exemptions. The study also expanded the researchers ideas on the topical issues.

Lessons for improving future projects: The study has revealed that although researchers are aware of the existence of patent regime yet it is not being utilized. Public education on the utility of patent to researchers would be a viable direction to move in the study. The study would therefore have been designed to incorporate extensive focus group discussions and seminars with the involvement of the Department of Registrar of Companies, Botswana and the Ministry of Science and Technology. A focus group discussion in each of the institutions would have been ideal.

Value and importance of the project: The project has exposed the team to understand in greater depth that although there exist legislation on the patent regime and research exemption, yet hardly do people know of its existence. Second, beneficiary of patent are mainly foreigners. Local participation is almost at zero level. This therefore calls for public education of the local population on existing legal framework about patent. The time and effort spent in the research has been value added to team's knowledge of researchers' attitudes towards research and inventions. The team has come to appreciate that many

researchers come up with new discoveries withot realizing how those discoveries can be used to improve themselves or their institutions economically.

Recommendations to IDRC: Programme of public education on patent regime need to be mounted for the researchers and people of Botswana. This programme would require financial and material support from IDRC or other agencies interested in capacity building. Workshops, seminars can also be organized regularly or incorporated into the public education programme.

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APPENDIX 1

QUESTIONNAIRE FOR THE STUDY

UNIVERSITY OF BOTSWANA
DEPARTMENTS OF STATISTICS AND LAW

TOPIC: ASSESSING THE CHALLENGES OF PATENT AND RESEARCH EXEMPTION ON RESEARCH CAPACITY AND UTILIZATION IN UNIVERSITIES, RESEARCH INSTITUTIONS AND INDUSTRY IN BOTSWANA

QUESTIONNAIRE

We are undertaking a study on the above title aimed at assessing how patenting of research outputs and research exemptions influence research capacity and utilization of research findings. We would appreciate if you could fill out the attached questionnaire. It will only take about thirty minutes to complete it. There are spaces that have been created for additional comments to some questions and please kindly provide those comments. You might use additional paper if the space is not enough for you. All your responses will be treated confidentially. No names of participants will be mentioned in any of our reports.

If you have additional questions or issues concerning this study or questionnaire please contact any of the following:

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GOD BLESS YOU FOR ACCEPTING TO PARTICIPATE

PART A: GENERAL QUESTIONS

1. **Name of Institution: ……**
2. **Location of Institution: ……...**
3. **Type of Institution** *(Circle the one that applies to you)*
   (A) University (B) Research Institute (C) Company (D) Industry
   (E) Pharmaceutical/Medical (F) Government (G) Nonprofit Organisation
   (H) Healthcare Organisation (I) Self-employed/Consulting Firm
   (J) Any other (please specify) ……
4. **Department: ……**

PART B: PATENT

Patents are rights granted by a state to an inventor to prevent other people or organizations from making, using, offering for sale, selling and distributing the invention (technology) for these purposes without the patent owner's consent.

We shall be asking you questions on your knowledge and use of patents and how it has impacted on research capacity and utilization in universities, companies and industries in Botswana.

5. **Are you aware that you can protect your invention through patent?**
   1= No 2 = Yes

6. **Have you or your organisation applied for patent for any of your invention?**
   1= No 2 = Yes
7. How **many patent applications and in what subject areas have been filled by**
   (i) You? Number: …… Area: ……
   (ii) Department? Number: …….. Area: ……
   (iii) company/institution? Number: …….. Area: ……
   (iv) Not applicable

8. **How many patents were granted to** ***(for the period 1966-2008)***
   (i) You? Number: …….. Area: ……
   (ii) Department? Number: …….. Area: ……
   (iii) Company/institution? Number: …….. Area: ……
   (iv) Not applicable

9. **How long (months) did it take you or your organisation to obtain the last patent?**
   1= Less than 2; 2 = 3- 5; 3 = 6- 8;
   4= More than 8; 9 = Not applicable

10. **What method did you use to acquire your patent?** *Use 1=No; 2 = Yes; 9= Not applicable*

S/No.	Method	Response
(i)	Sponsored Research Agreement	
(ii)	Confidentiality Agreement	
(iii)	Exclusive license	
(iv)	Material Transfer Agreement	
(v)	Informal	
(vi)	Non-exclusive License	
(vii)	Not applicable	

11. **What type of difficulty did you encounter in acquiring the patent?**
    1= Overly complex licensing negotiations; 2 = High individual royalties;

3= Necessary patents not licensable; 4 = Breakdowns in licensing negotiations;
9 = Not applicable

12. **Assess the importance of the following types of methods in protecting you or your organisation's inventions?** *(use the following scale: 1=not important; 2= modestly important; 3= important; 4= very important; 9= Not applicable)*

S/No.	Item	Response
(i)	Patent	
(ii)	Secrecy	
(iii)	Lead-time advantage	
(iv)	Customer relations management	
(v)	Complex product design	
(vi)	Trademarks	
(vii)	Long term labour contracts	
(viii)	Exclusive contract with suppliers	
(ix)	Embodying intangibles in products (i.e software in machinery)	

13. Has your research been affected by difficulties in obtaining patent?
1= No 2 = Yes 3= Not applicable

14 . In what ways has patenting affected your research or organization's research capacity?
(*Use 1=No; 2= Yes)*

S/No	Item	Response
(i)	Researches have been abandoned for fear of patent infringement	
(ii)	Scarce resources have been diverted to inventions that can be patented	
(iii)	Increased the cost of downstream researches	
(iv)	Material acquisition have become increasingly difficult and costly	
(v)	Has had a negative impact on research investments and innovations	
(vi)	Limits further researching and breeding of crops essential for food security	
(vii)	Researches have been abandoned because of difficulties in arranging overlapping patents	
(viii)	Researches infringing on patents attract damage costs as well as ongoing license fee for future use of the invention	
(ix)	Transaction costs in arranging patent were unaffordable to the researcher(s)	
(x)	Innovations were affected because researchers were now restricted to areas without patent rights	
(xi)	The pace of research innovations slowed down substantially because of activities of the patent holder	
(xii)	Created private incentives to delays so as to keep a larger share of the monetary and nonmonetary benefits of the research	
(xiii)	Has limited market competition	
(xiv)	Restricts use of new inventions and thereby reduce their social benefits	
(xv)	Might distort economic activity as firms race to obtain patents by means of inefficient research efforts	
(xvi)	Hinders progress by providing disincentive for other persons to improve on patented inventions	
(xvii)	Publication records have since increased because of patenting behavior of academics	
(xviii)	Publication records have since reduced because of patenting behavior of academics	
(xix)	The quality of publication records have since reduced because of patenting behavior of academics	
(xx)	The quality of publication records have since increased because of patenting behavior of academics	
(xxi)	Any other (please specify) ……	

15. **In cases where researches were either changed or abandoned, what was (were) the reason(s)?**
Use 1= No; 2= Yes ; 9= Not applicable

S/No	Item	Response
1	Acquiring patented technology involved complex licensing negotiations	
2	High individual royalties	
3	Necessary patents were not licensable	
4	Breakdown in licensing negotiations	
5	Lack of knowledge about patent	
6	Any other(s) (specify)	

16. **How important are patents for you or your organization in the context of :** (*use the following scale: 1=not important; 2= modestly important; 3= important; 4= very important*; *9 =Not applicable*)

Item	Description	Response
(i)	The acquisition of venture capital?	
(ii)	Mergers with other companies/institutions?	
(iii)	Co- operation with other companies/institutions?	
(iv)	Public funding of research and development?	
(v)	Timing of scientific publications?	
(vi)	The number of scientific publications?	
(vii)	The use of research tools?	
(viii)	Any others (specify)…….	

17. **Which of the following motivated you or your organization to patent your invention?** *Use 1= No; 2= Yes ; 9= Not applicable (Multiple responses are allowed)*

S/No.	Item	Response
(i)	Protecting own technology from imitation	
(ii)	Preventing competitors' patenting and application activities	
(iii)	Improving technological portfolio of company/institution	
(iv)	Improving organization negotiations (e.g. exclusive licensing, joint ventures)	
(v)	Improving academic representation of institution	
(vi)	Improving research and development cooperation	
(vii)	Timing scientific publications	
(viii)	Generating licensing income	
(ix)	Acquiring private research and development funding	
(x)	Cooperating with other institutions	
(xi)	Acquiring venture capital	
(xii)	Increasing the number of scientific publications	
(xiii)	Acquiring public research and development funding	
(xiv)	Mergers with other institutions	
(xv)	Preventing patent infringement suits	
(xvi)	Building barriers to market entry for competitors	
(xvii)	As incentive to invest in inventive activities	

18. W**hat percentage of patentable inventions did**
(i) you choose not to patent during the period 1966-2008? Number ……..
(ii) you omit to patent during the period 1966-2008? Number ……..
(iii) Not applicable

19. **What were your reasons?** *Use the scale: 1= not relevant; 2 = modestly relevant; 3= relevant; 4= very relevant; 9 =Not applicable)* (Multiple answers required)

	Item	Response
1	It is too time-consuming	
2	It requires a lot of expertise	
3	It is very expensive to keep patents alive	
4	Difficulties with legal enforcement of process patent infringement	
5	Protection requires disclosure of important information about inventions	
6	We only have small step inventions (improvements)	
7	Difficulties with legal enforcement of product patent infringement	
8	Publications in scientific journals are more important to us	
9	Any other (specify) …….	
10	Not applicable	

20. **How often have you or your organization experienced the following problems with patents?**
Use: *1=Never; 2=Rarely; 3= Sometimes; 4=Often; 5= Very often; 9= Not applicable*

S/No	Item	Response
1	Unawareness of research staff about patenting	
2	Difficulties to enter a technological field because of too many patents	
3	Patents blocking access to technologies	
4	Patents impeding further Research and Development	
5	Conflicting and overlapping patents	
6	Dependency on previous patents	
7	Patents hampering research co-operations	
8	Proliferation of legal patenting disputes	
9	Over-complex patent licensing negotiations	
10.	Breakdown of patent rights negotiations	
11.	Individual royalties are too high	
12.	Accumulation of too many royalties for too many different patent holders	
13.	Others:----------	

PART C: Intellectual Property Rights Management

21. **How important was each of the following methods for you or your organization in protecting inventions or innovations during the period 1966-2008?** *(use the following scale: 1=not important; 2= modestly important; 3= important; 4= very important)*

S/No	Item	Response
I.	Patents	
II.	Trademarks	
III.	Secrecy	
IV.	Long-term labour contracts	
V.	Lead-time advantages	

VI.	Customer relations management	
VII.	Exclusive contract with suppliers	
VIII.	Complex product design	
IX.	Embodying intangibles in products (i.e. software in machinery)	
X.	Any others : …….. ……	

22. Which countries are the 10 most important for you or your organization to apply for patent protection? (List them in order, starting with the most important)

(i) ……
(ii) ……
(iii) ……
(iv) ……
(v) ……
(vi) ……
(vii) ……..
(viii) ……..
(ix) ……
(x) ……

23. To which extent do you practice the following patent strategies? *(Use the following scale: 1=Never; 2=Rarely; 3= Sometimes; 4=Often; 5= Very often)*

S/No.	Item	Response
I.	Examine competitor's portfolio	
II.	Evaluate the state-of-the art in technological field	
III.	Exert a purely defensive patenting strategy (Protection of own technology)	
IV.	Exert offensive patenting strategy (blocking of foreign technology)	
V.	License in foreign technology	
VI.	License out own technology	

24. To what extent have you or your organisation had experience with*(Use the following scale: 1=Never; 2=Rarely; 3= Sometimes; 4=Often; 5= Very often; 9 = Not applicable)*

S/No.	**Item**	**Response**
1	Patent pools? (Collection of patents on various aspects of one invention)	
2	Cross- licensing? (Negotiating through many contracts to obtain license)	
3	Patent consortia? (Non-profit entity that makes knowledge available without royalty payment)	

25. If 'Never or rarely", in 24, what was your reason? *Use 1= No; 2 = Yes*

S/No	**Item**	**Patent pools**	**Cross licensing**	**Patent consortia**
1	We are cautious about collaboration with competitors and therefore reluctant			
2	We do not know how to use			
3	We are not convinced of the effectiveness of			
4	We have anti-trust concerns of using			
5	We avoid legal complications			
6	We experienced major difficulties using			
7	Any other: …….			

26. Which of the following strategies have been commercially successful in your organisation? (*Tick the one(s) that apply to you*)

1. Strategic Patenting	
2. Licensing strategies	

27. Legal issues related to your Organisation: Indicate the extent of the following legal issues in your organization? *Use the following scale: 1=Never; 2=Rarely; 3= Sometimes; 4=Often; 5= Very often; 9 = Not applicable, in answering the following questions*

S/No.	Item	Response
(i)	Have been sued due to patent infringement	
(ii)	These suits were successful	
(iii)	Have sued other individuals or individuals due to patent infringements	

(iv)	Were successful in these lawsuits	
(v)	The related costs for you or your company/institution were high	
(vi)	You or your organisation need external legal advice on patents	

28. How much (Pula) did the lawsuits cost you or your organisation?

(i) When you or your organization were sued P ……..

(ii) When you or your organization sued other people P……...

PART C: RESEARCH EXEMPTION

Research exemption for patented inventions is a right granted to researchers to use an invention without infringing the rights of the patent holder of the invention. Without an exemption it is possible that scientists and universities may be sued for patent infringement if they make use of a patented invention in the course of their research. In this section we shall be finding out your opinion on how research or experimental use exemption can help in increasing research capacity and innovations in companies, industry and institutions in Botswana.

29. Are you aware that you or your company can invoke a research exemption to avoid infringement on use of patented invention or knowledge which you need in your research?

1= No 2 = Yes

30. Do you know the procedure for invoking research exemptions?

1 = No 2 = Yes

31. Have you or your organization ever invoked for research or experimental use exemption in your research or studies?

1= No 2= Yes

32. Why did you invoke the exemption? *Use 1= No; 2= Yes*; *9= Not applicable. (Multiple answers required)*

Reason	Response
(1) Was aware the research involved a patented invention	
(2) Did not want to infringe on the rights of patentee	
(3) To be free to use all desired and available research tools	
(4) In order not to put my company or institution to ridicule	
(5)The patent on the related research topic was still in place	
(6) The license fee had been built into the budget for the study	
(7)The funding agency applied for the patent as part of the contract	
(8)The project had the best potential for improving my research ability	
(9)Any other (specify)	

33. Do you consider that Universities and Research Institutions should be granted research exemption?

1 = No 2 = Yes

34. If 'Yes' in 33, what are your reasons? ***Select as many as might apply to you;*** *Use 1=No; 2= Yes: 9= Not applicable*

S/No.	Item	Respons
1	Research helps to verify the truthfulness and accuracy of patent claims	
2	Research is used for comparison to a new technology	
3	Research is used to gain scientific knowledge with no foreseeable commercial application	
4	Research is used for classroom teaching	
5	Research is used to develop new research tools donated to the public	
6	Any other: …….	

35. What factors do you think should be considered when advocating for research exemptions. *Use 1= No; 2= Yes; 9= Not applicable*

S/No.	Item	Response
(1)	Whether research is to test for validity of the patent	
(2)	Whether research is to invent around patented invention	
(3)	Type of use (experiment on or experiment with)	
(4)	The interest of the patentee	
(5)	The nature of the invention	
(6)	Whether it is for profit or not-for-profit	
(7)	Development of effective competition	
(8)	Motivation of the researcher to invent	
(9)	The legal framework of the patent (whether there is option for compulsory or statutory license)	
(10)	Any other (specify): ……	

36. In what ways can research exemption affect research capacity in the institutions, companies and industries in Botswana? *Use 1= No; 2=Yes; 9 = Not applicable*; (Multiple responses are allowed)

S/No.	Item	Response
(i)	Transaction costs involved in multiple licensing will be removed from research costs making it easier to fund researches.	
	Researches which had been abandoned because of difficulties in arranging overlapping patents in the case of multiple licensing arrangements will be resuscitated	
iii	The absence of damage costs as well as ongoing license fee for future use of invention paid on infringement on patents would mean less cost on researches	
iv	Emphasis will shift to unveiling puzzles which are of interest to scientists than those that have commercial significance	
v	Certain studies with high potentials can now be conducted for Ph.D and Masters degrees	
vi	Studies will now be based on total expected value of the research itself excluding transaction costs	
vii	Researches will be undertaken irrespective of uncertainties underlying the usefulness of previous results to the current study	
viii	Many researchers will now participate in research to meet their interests in certain topical areas	
ix	Researchers will no longer be secretive about their output and will be more prepared to share knowledge	
x	There will be no privatization of scientific commons and knowledge will be readily available to the social optimum	
xi	Might increase the incentive to disclose information about inventions	
xii	Any other specify) ……. ……..…	

37. In what ways can the research exemption affect research utilization in the institutions, companies and industries in Botswana? *Use 1= No; 2=Yes; 9 = Not applicable;* (Multiple responses are allowed)

S/No	Items	Response
(i)	Information on research output will be readily available for scientist to improve or extend	
(ii)	The rights attached to a patent will be restricted to specific classes of action rather than the more general 'use' or 'exploit' where those classes do not include research uses.	
(iii)	The definition of infringement will be amended so that research will fall outside the category of infringing behavior	

(iv)	Lead to introduction of compulsory license	
(v)	Introduction of statutory research use exemption	
(vi)	Research outputs will become public goods	
(vii)	Information to assist in prosecuting a patentee who had acquired an invalid patent will be easily obtained	
(viii)	Limit privatization of scientific commons and enhance underutilization of knowledge	
(ix)	Improvement of application and adaptation of inventions in a different technological area	
(x)	It will become easier to subsidize the process of inventing around the patent	
(xi)	Knowledge will be expanded to users more generally	
(xii)	Any other (specify):	

38. What are the effects of research exemption on the incentive to invest in research? *Use 1= No; 2=Yes; 9 = Not applicable*; (Multiple responses are allowed)

S/No.	Item	Response
(i)	The patentee is deprived royalty that would have been paid for use of patented technology in research	
(ii)	Free use of patented technology would increase the probability of developing new or improved competing technology with losses on the old technology	
(iii)	Value of patented base technology would decrease	
(iv)	Consumers would prefer to go for the new or improved competing technology when it becomes available	
(v)	Retards innovation because industry would be reluctant to file patents and provide invention disclosures in case of infringement	
(vi)	Interferes with efficient pursuit of follow-on research	
(vii)	Increases research output in terms of quality and quantity	
(viii)	Any other: ……..	

SECTION D: EXTENT OF SUPPORT TO RESEARCH

39. Have you been involved in any research?
(A) 1 =No
(B) 2= Yes

40. What type of research was it? ***Multiple answers required. Use the scale 1=No; 2=Yes for the response; For type of support use the scale: 1=externally funded, 2=internally funded; 3= out of pocket***

S/ No	Type of research	Response	Number of times	Type of support	Total value of support (Pula)
(1)	Experimental				
(2)	Desk study				
(3)	Survey				
(4)	Consultancy				
(5)	Any other (specify)				

41. How would you rate the level of support given to research by
(Use the scale: 1= very inadequate; 2= inadequate; 3= adequate; 4= very adequate; 5 = Excellent)

S/No.	Item	Response
1	Government of Botswana?	
2	Your institution?	
3	Collaborating agencies/External funding agencies?	
4	Any other (specify)?.....	

42. How in your opinion should research be made more attractive?

……
……
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43. As a researcher, what are the challenges you have in advancing your research as a result of patenting of inventions?

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44. How could these challenges be overcome?

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45. What are the impacts of patenting on investment incentives?

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APPENDIX 2

REPORT ON FOCUS GROUP DISCUSSIONS

Introduction

Focus Group Discussion is a qualitative research method. It is a group discussion involving approximately 6 - 12 persons guided by a facilitator, during which group members talk freely and spontaneously about a certain topic. The purpose is to obtain in-depth information on concepts, perceptions and ideas of a group. An FGD aims to be more than a question-answer interaction. The idea is that group members discuss the topic among themselves, with guidance from the facilitator. FGD techniques can, for example, be used to focus research and develop relevant research hypotheses by exploring in greater depth, the problem; formulate appropriate questions for more structured, larger scale surveys; and help understand and solve unexpected problems in interventions.

The FGD was used in this study mainly to understand people's perceptions of the patent rights and research exemptions, their understanding of the utility and reasons for not using the patent rights to protect their inventions (if any). Two Focus Group Discussions were organized, one at the Harry Oppenheimer Okavango Research Centre (HOORC) in Maun, a centre under the management of the University of Botswana situated in the northern part of Botswana, and a second one at the University of Botswana campus in Gaborone, the capital city of Botswana.

FGD at HOORC

1. This first FGD took place in the conference room of the Harry Oppenheimer Okavango Research Centre (HOORC) Maun on Friday the 3 October 2008. The session started at 10 am and ended at 12.30 pm.

2. It was chaired by Professor M. J. Chambari, the Deputy Director of HOORC. After welcoming the participants and thanking them for responding to the invitation, he introduced the two

researchers, Dr N.O.Ama and Prof C.M. Fombad from the University of Botswana. He then invited the participants to introduce themselves. The following participants attended the FGD:

3. The list of participant is contained in the table below.

Table 1: List of participants at the HOORC FGD

NAME	POSITION	ADDRESS	E-MAIL
M.J.CHIMBARI	Deputy Director	HOORC	mchimbari@orc.ub.bw
PIOTA WOISUI	Senior Research Scholar	HOORC	pwolski@orc.ub.bw
LARS RAMBERG	Professor	HOORC	lramberg@orc.ub.bw
W.R.L. MASAMBA	Senior Research Fellow	HOORC	wmasamba@orc.ub.bw
M.J.J.MANGUBULI	Deputy Principal	BWTI	m-jj-mangubuli@hotmail.com
PHEMELO GADIMANG	Senior Lecturer	BWTI	pgadimang@hotmail.com
M.C. BONYONGO	Research Fellow	P/Bag 285 Maun	cbonyongo@orc.ub.bw
C. MONYADZWE	Lecturer	BWTI	cmonyadzwe@yahoo.co.uk
M.G.MOKOTEDI	Research Officer(Agric)	MoA	malefsane@yahoo.com
L.C.BOSEKENG	Research Officer (Agric)	MoA	lambanibosekeng@yahoo.com
C.M.FOMBAD	Professor	UB	fombad@mopipi.ub.bw
N.O.AMA	Senior Lecturer	UB	amano@mopipi.ub.bw

HOORC- Harry Oppenheimer Okavango Research Centre; BWTI – Botswana Wild Life Institute; MoA – Ministry of Agriculture; UB- University of Botswana

4. The chairperson then asked the researchers to briefly explain the objectives of the research and the purpose of the FGD. Dr. Ama welcomed the participants and pointed out that this was a follow up meeting to clarify a few issues that had arisen in the course of analysing the questionnaires which the participants had completed when the researchers came to Maun in July 2008. He said that as key stakeholders, the participants were well placed to provide useful information that could considerably enhance the research and therefore hoped that all present will be open and constructive. He indicated that the discussion was going to centre around the list of questions that had been sent to the participants a few days earlier.

5. The chairperson pointed out that participants should feel free to express their views as no answer was right or wrong. He made it clear that it was more of a learning process where participants would probably gain a better understanding of patents and research exemptions, but they first had to indicate their understanding of these concepts and how it affected them in their

professional day to day work. What follows attempts to summarise some of the key issues that arose as well as the views expressed by the participants.

6. A number of questions tried to find out the participants' understanding of patent, and whether they knew of the patent regime in Botswana and its possible application to their daily activities as researchers. A question was also asked about their knowledge of research exemptions and its possible application to their professional life as researchers and lecturers.

On the question of knowledge of patents, it was clear that many of the participants did not understand clearly what patent rights are all about. For instance one participant defined patent as "Documents prepared containing what has been discovered which needs to be protected".

Another participant qestioned whehter "the idea of patents is valid." He was not alone in expressing these reservations because another participant claimed that the "inventor" of the popular local beer, "St Louis" brewed by Kgalahari brewery is alleged to have sued the company claiming the right to this "invention" but lost the case. He appeared to suggest that a person could not easily be granted a patent over his invention. Although various suggestions as to the meaning of a patent were made, after the researchers read and explained the definition of patent contained in Section 8 of the Industrial Property Act, it became clear to the participants that they did not clearly understand what patents was all about.

7. On the question of research exemption, one participant said, "I think that it is the use of confidential data for research purposes," and another said that he thought that "it was a sort of research permit". Although the discussion was very lively it became very clear from the researchers' explanation of what patents and research exemptions are, their role in promoting research, innovation and development, that there was a general lack of patent and research exemption awareness amongts the participants. One participant pointed out that in his department, they had developed a drought resistant and high yielding specie of sorghum and had made this information freely available without realising that this could have been patented. Another researcher said that they have been working on extracting the active ingredients in medicinal plants and were again not aware that the results of their exertions could be patented.

8. When the participants in the Ministry of Agriculture were asked whether they saw any prospects for patenting their products the answer was no. To these participants and those working in the Wildlife department, they felt that under the present service conditions, everything they did belonged to the Government.

8. In dealing with the question whether they thought patents and research exemptions are important and could help them as well as the country, the participants agreed that they now had a

very clear idea what these concepts are all about and think that it has got considerable potential not only for them but for the country as a whole; they felt that there were a number of serious problems that needed to be overcome. These were identified as:

i) The preoccupation by Government with enacting legislation on patents and other intellectual property rights without any policy designed to create an awareness amongst the people or providing any incentives to potential inventors.
ii) The present secrecy and confidentiality laws that many felt inhibit the innovative spirit.
iii) Excessive bureaucracy and the present government structures, even within research institutions which neither promote nor encourage an inventive spirit.

9. The participants felt that a number of things needed to be done:

i) There should be a government policy within government departments that have research and development sections as well as government research institutions that promotes IP awareness.
ii) The present Industrial Property Act should be revised to contain provisons which provide incentives to inventors such as providing for a 50/50 sharing of royalties from patents.

10. At the end of the session, many of the participants felt that they now had a better grasp of the concept of patents and research exemption and were going to see how they could exploit this knowledge for their benefit.

FGD at Gaborone

1. The second FGD of this study took place on 7 November 2008 in a seminar room of the University of Botswana Library.

2. The table below contains the names of those who attended this FGD.

Table 2: List of Participants at the Gaborone FGD

S/NO.	Name	Institution/Ministry/Company	E-mail Address	Telephone Number
1	P. Ndebele	University of Botswana	Paul.ndebele@mopipi.ub.bw	3552911
2	O. Monngakgotla	Department of Research Science Technology	omonngakgotla@gov.bw	3613100
3	Helen Aforji	54095 Kgale View, Gaborone	nneomagood@yahoo.com	3132248
4	Esther Okpo	2584 Zebra way, Gaborone	oga@yahoo.com	3258688
5	Dr Molebatsi	University of Botswana		3912180

6	C. Mwendapole	University of Botswana	mwendapolec@mopipi.ub.bw	3554232
7	Lillian Moleti	Registrar of Companies	lillianmoleti@yahoo.com	3188754
8	Kesupemang Pitlagano	Registrar of Companies	kpitlagano@gov.bw	3188754
9	N. O. Ama	University of Botswana	amano@mopipi.ub.bw	3552705

3. The researcher, Dr N. O. Ama, briefed the participants on the purpose of the FGD and explained that it was a follow-up on the quantitative data collection which was conducted between July and August 2008 and that this was the second in the series of FGDs; the first was conducted in HOORC, Maun at beginning of October 2008.

4. The discussions were based on a series of questions that had been sent to the participant a week before the meeting as well as other issues that were raised by the participants themselves.

5. On the question of patent awareness, it was agreed that the level of such awareness was low. To one participant: "This is a new area, and the Registrar of Companies and the relevant ministry should have done more to acquaint people about it." It was also felt that it wasn't just enough for the University to have a policy on this, it should go further and actually ensure that people, especially researchers are fully acquinted with this.

6. The participants agreed that "applications from locals are not very encouraging; the applications are not properly written; our lawyers are not very experienced with drawing up the applications; and the applications therefore end up being rejected". They emphasized on the need to have qualified people to assist applicants in drawing up their claims.

7. The participants agreed that application for patent is not expensive in Botswana as it costs only P100. The applicants should consult the Registrar of Companies for procedure required in filing an application. Unfortunately the Registrar of Companies does not have expertise to assist applicants to daft their application and claims.

8. The participants were of the view that education, sensitization, awareness creation should be the responsibility of the Registrar of Companies. The participants from the Registrar of Companies pointed out that "there are plans by the Registrar of Companies to go out and sensitize the people", but noted that they were constrained by the absence of sufficient personnel in the service as well as lack of adequate resources to go around the country.

9. At the end of the discussions it was agreed that:

i) The Department of Registrar of Companies should do more to make people, especially researchers in both the private and public sector to be aware of the potential of patents and research exemption in promoting innovation and development.

ii) The University and other tertiary institutions in the country should do more to promote patent awareness amongts researchers and provide resources as well as other incentives, such as promotion, to encourage innovation.